THE FACTORS INFLUENCING OBESITY AMONG HEALTHCARE WORKERS IN TWO PUBLIC HOSPITALS IN KEDAH

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MASTER OF SCIENCE

UNIVERSITI UTARA MALAYSIA

March 2020

THE FACTORS INFLUENCING OBESITY AMONG HEALTHCARE WORKERS IN TWO PUBLIC HOSPITALS IN KEDAH

By

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Thesis Submitted to
School of Business Management,
Universiti Utara Malaysia,
in Fulfillment of the Requirement for the Degree of Master of Science
(Occupational Safety and Health Management).

Pusat Pengajian Pengurusan Perniagaan
(School of Business Management)

Kolej Perniagaan
(College of Business)

Universiti Utara Malaysia

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Tarikh: **10 October 2019**
(Date)

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Program Pengajian *(Programme of Study)*	:	Master of Science (Occupational Safety and Health Management)
Nama Penyelia/Penyelia-penyelia *(Name of Supervisor/Supervisors)*	:	Assoc. Prof. Dr. Nor Azimah Chew Abdullah

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ABSTRACT

In Malaysia, the prevalence of obesity is high among healthcare workers and this becomes a problem because they have the responsibility to promote health and prevent obesity. Besides that, obesity is also associated with higher incidences of injuries at the workplace together with higher medical costs, more lost workdays, and reduced productivity at the workplace. The aim of this study was to identify the factors influencing obesity among healthcare workers and to determine the strategies to control obesity. A qualitative research was conducted among 20 obese healthcare workers through individual semi-structured in-depth interviews, and the interviews were audio recorded. Then, the data were transcribed and analysed by using thematic analysis. The results showed that the themes on the factors influencing obesity were mainly dietary behaviour, job stressors, and working conditions. A total of 26 factors emerged from the data, 22 of these factors had been identified in previous studies while four new factors were found in this study. The participants also suggested several strategies to control obesity including improvement in knowledge, motivation, and exercises. However, the extent of the effectiveness of these strategies could not be confirmed in this study and further studies are recommended on this matter. All of the objectives of this study were achieved. This study provides theoretical contributions to Social Ecological Model on the factors influencing obesity among healthcare workers and helps to develop strategies for weight management at the workplace.

Keywords: Obesity, healthcare workers, dietary behaviour, job stressors, working conditions.

ABSTRAK

Di Malaysia, kadar peratusan obesiti adalah tinggi dalam kalangan pekerja kesihatan, dan hal ini menjadi masalah kerana mereka bertanggungjawab dalam menjaga kesihatan dan mengurangkan kadar obesiti. Di samping itu, obesiti juga dikaitkan dengan peratusan kecederaan di tempat kerja yang tinggi, kos perubatan yang tinggi, kerap tidak hadir bekerja, dan kurang produktiviti di tempat kerja. Kajian ini dijalankan untuk mengenal pasti faktor yang mempengaruhi obesiti dalam kalangan pekerja kesihatan dan menentukan strategi bagi mengawal obesiti. Kajian kualitatif ini melibatkan 20 pekerja kesihatan yang obes, dan data kajian diperoleh melalui kaedah temu bual individu separa berstruktur, dan setiap temu bual dibuat rakaman audio. Kemudian, data kajian dibuat transkripsi dan dianalisis menggunakan analisis tematik. Keputusan kajian menunjukkan tema penentu yang mempengaruhi obesiti adalah cara pemakanan, faktor tekanan kerja, dan keadaan kerja. Sejumlah 26 faktor terhasil daripada data, 22 faktor yang dikenal pasti merupakan faktor yang telah ditemui dalam kajian terdahulu, manakala empat faktor lagi adalah penemuan baharu bagi kajian ini. Peserta kajian turut mencadangkan beberapa strategi bagi mencegah obesiti termasuk meningkatkan pengetahuan, motivasi, dan aktiviti senaman. Walau bagaimanapun, kajian ini tidak dapat memastikan tahap keberkesanan strategi yang dicadangkan dan kajian lanjut perlu dilakukan dalam hal berkenaan. Kajian ini telah mencapai semua objektif yang disasarkan. Kajian ini memberikan sumbangan secara teori terhadap Model Ekologi Sosial bagi penentu obesiti dalam kalangan pekerja kesihatan dan membantu dalam membina strategi pengurusan berat badan di tempat kerja.

Kata kunci: Obesiti, pekerja kesihatan, cara pemakanan, faktor tekanan kerja, keadaan kerja.

ACKNOWLEDGEMENT

First and foremost, I would like to praise gratefulness to Allah as I have completed this thesis. I would like to express special appreciation to my supervisor, Prof. Madya Dr. Nor Azimah Chew Binti Abdullah for her contribution and effort in providing guidance, endless patience, and support throughout the process of completing this study.

I am also very grateful and deeply appreciate my parents, my father Azhari Bin Yaacob and my mother Fatimah Binti Ibrahim for their sacrifice, help, endless support in all aspects, trust, love, understanding, and financial support they have given to me. Special thanks also to my family members for making me realised that I am not alone in this journey. Thank you so much for my family and friends for giving me such a great strength of patience, courage, and ability to complete this thesis.

Besides, I would like to thank School of Business Management, Universiti Utara Malaysia for offering the program Master of Science (Occupational Safety and Health Management) and I would like to express appreciation also to Universiti Utara Malaysia for providing great facilities for the students.

Furthermore, I wish to express appreciation also for the examiners for evaluating this thesis. I also want to thank all the participants of study for their willingness to participate in this study and for their time to carry out part of the study and share their experiences throughout the interview process. Lastly, I am thankful to everyone who involved in this study whether directly or indirectly.

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LIST OF ABBREVIATIONS

Abbreviation	Definition
BMI	Body Mass Index
kg	Kilogram
m	Meters
ml	Mililitre
NCCFN	National Coordinating Committee on Food and Nutrition
NHMS	National Health and Morbidity Survey
NIOSH	National Institute of Occupational Safety and Health
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Obesity is a condition of having excess body fat to the extent that it may have negative effects on one's health (World Health Organisation [WHO], 2000; WHO, 2018a). There is no specific device which helps to measure obesity. A crude population measure of obesity is the body mass index (BMI). The BMI is defined by the calculation of a person's weight in kilograms (kg) divided by the square of his or her height in meters (m) (WHO, 2000; 2018a). Recently, the prevalence of obesity has shown an increasing trend globally and also in Malaysia (Chan et al., 2017; Ghee, 2016; Jang, Kim, Lee, Myong, & Koo, 2013; WHO, 2018a; Zainuddin et al., 2016). Obesity has become a global health problem and the problem not only occurs in developed countries, but it also spreads widely throughout the developing countries (WHO, 2018a). Figure 1.1 shows the obesity trend across the globe. Mohamud et al. (2011) indicated that obesity has become a concern as it may affect healthcare costs and may reduce the quality of life.

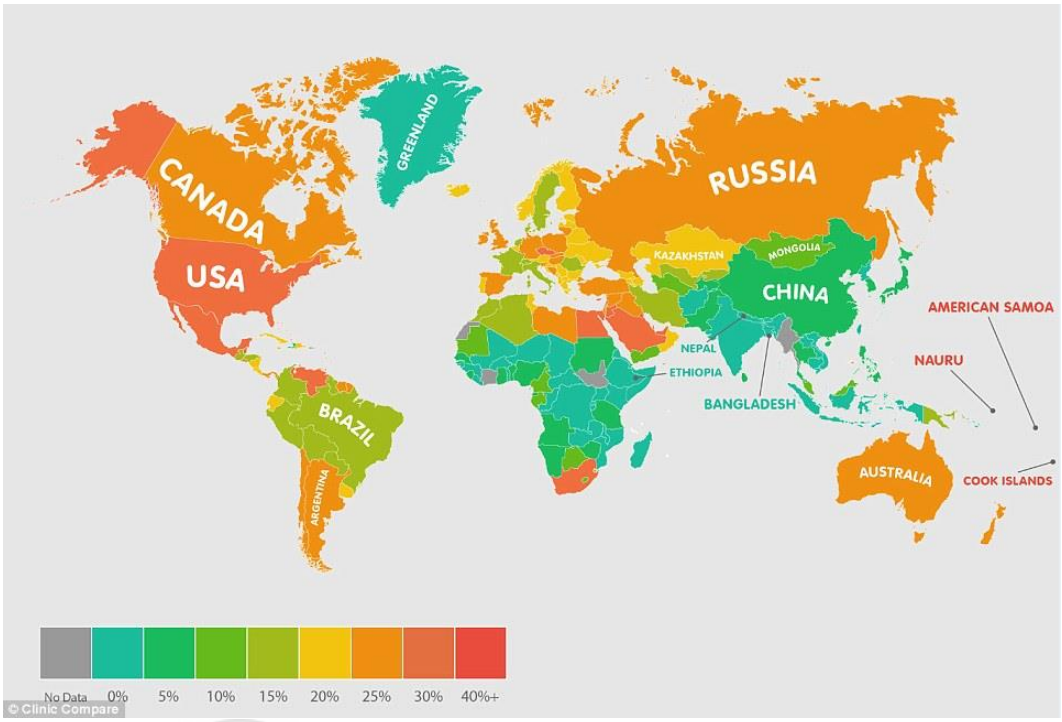


Figure 1.1
Percentage of Each Country's Populations That is Categorized as Obese (with Body Mass Index of Over 30)
Source: Davies (2015)

In the United States, it was found that in the years 1999-2000, there were 30.5% obese adults. Then, in 2005-2006 it increased to 34.3% and the trend keep going upwards as seen in the years 2013-2014 as the adults who were categorised as obese were at 37.7%, (Ogden, Carroll, Fryar, & Flegal, 2015). Further increase in trend was seen in 2015-2016 as the prevalence of obesity was 39.8% (Centers for Disease Control and Prevention, 2018). According to Davies (2015), high levels of obesity are indicated by the orange colour afterwards (25%) as shown in the Figure 1.2, which shows the obesity scale.

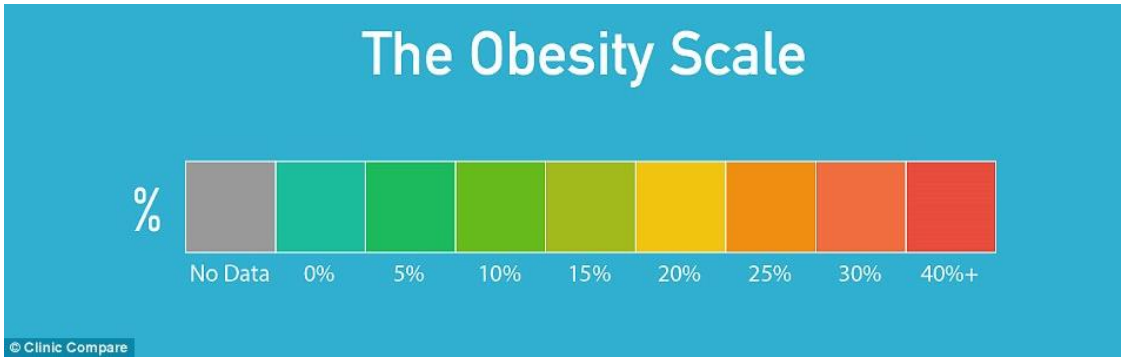


Figure 1.2
The Obesity Scale
Source: Davies (2015)

In Malaysia, the prevalence of obesity is high among adults (Chan et al., 2017; Hussain, Osman, Ismail, & Chan 2018; Mohamad Nor et al., 2018; Taib et al., 2019; Zainuddin et al., 2016) and children (Jay & Zulkifli, 2016; Woon, Chin, & Mohd Nasir, 2014). Samah (2018) stated that Malaysia had the highest prevalence of obesity among Southeast Asia countries in the year 2014 which was 13.3%. Table 1.1 shows the trend for obesity prevalence in 2010 and 2014 for adults in ASEAN countries. Then, Hasnan (2019) reported that the data from World Population Review (2019) also showed that Malaysia was ranked as the highest prevalence of obesity in ASEAN countries in 2019, with the prevalence of obesity was 15.6% as shown in Table 1.2.

Table 1.1
The Prevalence of Obesity in ASEAN Countries in 2010 and 2014

ASEAN Countries	Prevalence of obese adults (%)	
	2010	2014
Indonesia	4.3	5.7
Malaysia	**10.5**	**13.3**
Philippines	4.1	5.1
Singapore	5.0	6.2
Thailand	6.7	8.5
Vietnam	2.6	3.6

Source: Tacking obesity in ASEAN (2017)

Table 1.2
The Prevalence of Obesity by Population in ASEAN Countries in 2019

ASEAN Countries	Prevalence of obesity (%)
Brunei	14.1
Cambodia	3.9
Indonesia	6.9
Laos	5.3
Malaysia	**15.6**
Myanmar	5.8
Philippines	6.4
Singapore	6.1
Thailand	10.0
Vietnam	2.1

Source: Hasnan (2019) and World Population Review (2019)

In Malaysia, the numbers of people who are categorised as overweight and obese are increasing over time (Scawen, 2016). As stated by Scawen (2016), the former Malaysia's Health Minister in 2016, Datuk Seri Dr. S. Subramaniam, said that the prevalence of adult obesity in Malaysia had increased from only 4.4% in the year 1996 to 7.4% in the year 2006. Then in 2011, the prevalence of obesity had rapidly increased to 15.1% and continuously increased to 17.7% in 2015. The increasing trend of obesity in Malaysia is shown in Figure 1.3.

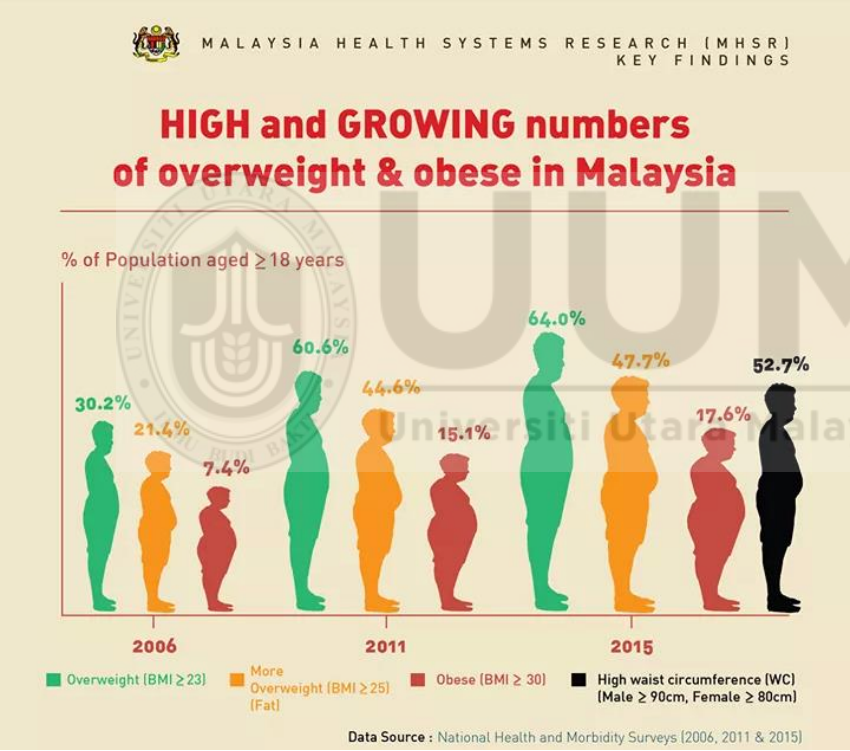


Figure 1.3
Overweight and Obesity Trends in Malaysia by National Health and Morbidity Surveys, 2006, 2011, 2015
Source: Ministry of Health Malaysia (2006, 2011, 2015)

The National Health and Morbidity Survey (NHMS) conducted in 2015 reported that the prevalence of overweight and obesity in Malaysia had increased by 0.5% for overweight and 2.6% for obesity compared to the previous findings that were found in the NHMS 2011 (Ministry of Health Malaysia, 2015). The current world prevalence of obesity at the time of this research was 13.0% and it showed that Malaysia had a higher prevalence of obesity compared with the world's prevalence of obesity (Ministry of Health Malaysia, 2015). Due to the alarming trend of obesity, the report from the Ministry of Health Malaysia (2015) stated that besides the need to revise the public health policies, there is also a need to provide a supportive environment and strategies for Malaysians to practice healthier lifestyles. Thus, it is beneficial to explore the factors which have influence on obesity.

Obesity is a continually growing problem in today's society. Based on the National Health and Morbidity Survey (NHMS) that was conducted in 2015, it was found that 47.7% of the adults in Malaysia were overweight or obese (Ministry of Health Malaysia, 2015). According to Scawen (2016), almost 18%, which consists of about more than five million people of the adults in Malaysia, could be classified as obese in 2015. Then, another 30% of the adults were overweight. This problem has reached a worrisome level as this situation might affect the health conditions of many people in Malaysia (Scawen, 2016). This is because obesity can be related to many non-communicable diseases, such as coronary heart disease, type 2 diabetes mellitus, and certain types of cancers (Jay & Zulkifli, 2016; Mikail, 2019). The government is really concerned about this matter and urged the associated ministries to control NCDs through National Blue Ocean Strategy (NBOS) (Harian Metro, 2016). The Former Deputy Health Minister, Datuk Seri Dr Hilmi

Yahaya stated that it is important to prevent NCDs because it was estimated that 73% of total death in the government hospitals were caused by NCDs and Ministry of Health with other private agencies will work together through NBOS to increase awareness to the public on the importance of healthy lifestyle (Bernama, 2018).

Farah Wahida, Mohd Nasir, and Hazizi (2011) emphasised that, adolescents and adults who are overweight and obese have a higher chance to develop chronic health problems. Overweight and obesity are associated with the increased prevalence of several diseases, such as cardiovascular diseases (Chan et al., 2017; Ghee, 2016; Mohamud et al., 2011; Zainuddin et al., 2016), hypertension (Abdullah, Mokhtar, Bakar, & Al-Kubaisy, 2015; Aniza et al., 2015; Chan et al., 2017; Zainuddin et al., 2016), respiratory problems (Ghee, 2016), osteoarthritis (Ghee, 2016; Zainuddin et al., 2016), some types of cancers (Chan et al., 2017; Ghee, 2016; Mohamud et al., 2011; Zainuddin et al., 2016), stroke (Zainuddin et al., 2016), and type 2 diabetes mellitus (Abdullah et al., 2015; Chan et al., 2017; Ghee, 2016; Mohamud et al., 2011; Zainuddin et al., 2016).

Besides that, obesity has become an important health issue because it might affect the employers and employees as it is associated with higher incidences of injuries at the workplace together with higher medical costs, more lost workdays, and reduced productivity at the workplace (Borak, 2011; Lin, Verma, & Courtney, 2013; Robroek, van den Berg, Plat, & Burdorf, 2011). There will also be more complications to injury treatment due to obesity. Obese workers also have higher medical expenses which are associated with longer durations of recovery (Bungum, Satterwhite, Jackson, & Morrow Jr, 2003).

The high prevalence of overweight and obesity in Malaysia has become a concern as it is linked with non-communicable diseases and it also has negative impacts towards employers and employees. Both the government and other employers have important roles to control and prevent obesity. Thus, it is important to find the risk factors and preventive measures for obesity as the prevalence of overweight and obesity keeps increasing in Malaysia. Therefore, this study helps to identify the factors influencing obesity among healthcare workers.

1.2 Problem Statement

Several occupations are associated with excess weight in Malaysia, such as administrative, senior officer/ manager, government/ semi government, shift workers, and housewives (Ghee, 2016). The National Health and Morbidity Survey 2011 reported that one category was found to have the most obese workers and that was the government/ semi government employees (Ghee, 2016) with a 40.3% rate, which could mean that two out of five civil servants in Malaysia may be obese (Cheng, 2016). The Prime Minister's Office revealed that there were 1.6 million employees in the civil service in Malaysia and it was the largest civil service in Southeast Asia (Cheng, 2016). Then, in 2015, the category with the most overweight was the government/ semi government employees (36.2%) and the most obese was unpaid workers/ homemakers (23.7%).

Despite several occupations being related with a high prevalence of overweight and obesity among workers, this study focused on healthcare workers as a study in England by Kyle et al. (2017) recommended further research to understand the reasons for the

high prevalence of obesity among healthcare professionals, especially among nurses. Furthermore, healthcare workers in public hospitals are government employees as reported in the National Health and Morbidity Survey 2011 the government employees were found to be the most obese; and in the National Health and Morbidity Survey 2015, the government/ semi-government employees were the most overweight.

A high prevalence of obesity was found among healthcare workers and it has become a concern because it may increase the risk of musculoskeletal conditions and mental health conditions (Kyle et al., 2017). These are among the causes of absence due to illness in the health services (Kyle et al., 2017). Further research is needed to have a better understanding of the reasons for the high rate of obesity among healthcare professionals, especially among nurses and unregistered care workers (Kyle et al., 2017).

Previous studies in Malaysia showed high prevalence of obesity among healthcare workers. Recently, a study by Taib et al. (2019) found that the prevalence of overweight and obesity among healthcare workers in Pejabat Kesihatan Daerah Melaka Tengah was 55.6%. Coomarasamy, Wint, Neri, and Sukumaran (2014) had conducted a study among 1086 Registered Nurses in Malaysia reported that 50.6% of the nurses had excess weight, including 33.5% who were overweight and 17.1% who were obese. The annual report from the Department of Health Negeri Kedah also showed high prevalence of overweight and obesity among healthcare workers which was 33.8% as shown in Table 1.3 (Jabatan Kesihatan Negeri Kedah, 2012).

Table 1.3
The Number of Hospital Workers in Kedah with BMI>24.9 in 2012

Hospital	Total number of hospital workers	Total number of hospital workers with BMI>24.9	Percentage of hospital workers with BMI > 24.9
Hospital Kuala Nerang	227	71	31.3
Hospital Sultanah Bahiyah	3211	879	27.4
Hospital Sultan Abdul Halim	2007	1105	55.1
Hospital Kulim	1022	275	26.9
Hospital Baling	341	125	36.7
Hospital Sik	251	56	22.3
Hospital Langkawi	407	40	9.8
Hospital Jitra	328	79	24.1
Hospital Yan	240	84	35.0
Total	8034	2714	33.8

Source: Jabatan Kesihatan Negeri Kedah (2012)

In an earlier study, the data from the District Health Office (Pejabat Kesihatan Daerah) Kuala Muda in 2011 taken from 544 healthcare workers found that 53% were overweight and 21% were obese (Clinical Research Centre, 2014). There is a need to control body weight among healthcare workers as obesity among healthcare workers in Malaysia has become increasingly prevalent (Hussain et al., 2018). It is important to pay attention to the issue of high prevalence of obesity among healthcare workers because this problem may have negative impacts on their health as well as the healthcare services, including the efficacy, safety, capacity, and sustainability (Kyle et al., 2017; Taib et al., 2019).

Healthcare workers also should show a good example to the community as they are the role models regarding healthy lifestyles, promoting health, and preventing diseases (Coomarasamy et al., 2014; Skaal & Pengpid, 2011; Taib et al., 2019) and they have the

responsibility to promote healthy lifestyles among the members of the general population (Coomarasamy et al., 2014; Sharma et al., 2016). Skaal and Pengpid (2011) added that the healthcare workers might be reluctant to discuss the issues regarding healthy lifestyles since they themselves are also having the problem with obesity. Furthermore, Cakmur and Anuk (2017) emphasised that healthcare workers play an important role in improving health outcomes and they are responsible for the prevention and management of obesity.

Obesity should be controlled and prevented as it is the common and modifiable risk factors underlying major NCDs (WHO, 2018b). Banjare and Bhalerao (2016) described that increased BMI has an impact on body systems which leads to development of NCDs. The authors also added that obesity related NCDs cause millions of deaths worldwide and it has also become an economic burden. Currently, NCDs represent 43% of the burden of disease globally and it is predicted an emerging epidemic of death due to NCDs might rise from 60% to 70% of all deaths in 2020 (Maimela et al., 2016).

In Malaysia, the prevalence of NCDs and risk factors of NCDs has kept increasing for the last two decades (Ministry of Health Malaysia, 2016). Due to that, the Malaysian Ministry of Health responded by implementing 'The National Strategic Plan for Non-communicable Diseases (NSP-NCD) 2016-2025'. Ministry of Health targeted to halt the rise of obesity and diabetes by 2025 (Lum, 2018). According to NHMS 2015, Kedah had the highest prevalence of diabetes and hypertension in Malaysia (Hamid, 2019; Muhamading, 2017), thus it is important to control the risk factors of NCDs. Mustapha et al. (2014) stated that the prevention of NCDs can be achieved by managing the risk factors early. The main objectives of the NSP-NCD 2016-2025 which are related to this study is to reduce modifiable risk factors for NCDs and underlying social determinants

by the development of health-promoting environments. The other objective is to promote and support high-quality research and development for the prevention and control of NCDs (Ministry of Health Malaysia, 2016).

The Former Human Resources Minister, Datuk Seri Richard Riot mentioned that Malaysia encountered an epidemic of Non-Communicable Diseases (NCDs) with a high prevalence of obesity, diabetes, hypertension, and hypercholesterolemia (large amount of cholesterol in the blood) among adults, especially those aged above 40 years (Sivanandam, 2015). He added that 8912 Socso members became invalids and 5554 died as a result of NCDs. This condition becomes a loss to employers and it leads to a decrease in productivity. He stated that the high prevalence of NCDs has become part of the reason Socso introduced the Health Screening Programme (HSP) in 2013. The HSP found that 39% were overweight, 34% were obese, 27% had hypertension, 9% had diabetes, and 62% had hypercholesterolemia. The government has to pay attention to the risk factors of NCDs in order to prevent any further increase of NCDs in the future as Sivanandam (2015) emphasised that NCDs cost Socso RM 627, 401, 831 in 2014 for invalidity payments and survivors' pensions.

Several factors which were studied by previous studies regarding excess weight among adults included dietary patterns (Denova-Gutierrez et al., 2011; Jamaluddin, Fokeena, & Khaza`ai, 2015; Mu, Xu, Hu, Wu, & Bai, 2017; Satija et al., 2015), dietary behaviour/ dietary choice (Bonnell et al., 2017; Jang et al., 2013; Lowden, Moreno, Holmbäck, Lennernäs, & Tucker, 2010; Pondor, Gan, & Appannah, 2017; Zhao & Turner, 2008), physical activity (Addo, Nyarko, Sackey, Akweongo, & Sarfo, 2015; Ayiesah et al., 2013; Chan et al., 2017; Haufiku & Amukugo, 2015; Hazizi et al., 2012; Mozaffarian,

Hao, Rimm, Willett, & Hu, 2011), and sedentary work/ behaviour (Addo et al., 2015; Choi et al., 2010; Heinonen et al., 2013; Kim, Park, & An, 2015).

The other factors which were studied regarding excess weight among adults included occupational stress (Buss, 2012; Faghri & Mignano, 2013; Hegg-Deloye et al., 2014; Nishitani & Sakakibara, 2006; Ribeiro, Ribeiro, Marziale, Martins, & Santos, 2011; Schulte et al., 2007), working conditions (Amani & Gill, 2013; Cheong, Kandiah, Chinna, Chan, & Saad, 2010; Haufiku & Amukugo, 2015; Lowden et al., 2010; Nobrega et al., 2016; Park, 2009), sleeping problems (Hegg-Deloye et al., 2014; Mozaffarian et al., 2011), alcohol consumption (Mozaffarian et al., 2011), knowledge on weight management (Poh, Sia, Norimah, & Ismail, 2006), smoking (Jan Mohamed et al., 2015; Mozaffarian et al., 2011), and snack consumption (Viskaal-van Dongen, Kok, & de Graaf, 2010). It shows that various factors were studied by previous researchers regarding the determinants of excess weight among adults. However, this study only focused on several factors which need to study further in order to expand on more information regarding the factors influencing obesity among healthcare workers.

Bonnell et al. (2017) and Lowden et al. (2010) stated that dietary behaviour might be altered among shift workers and they have a higher chance for the development of obesity. There is an increasing need to study different determinants of obesity especially the dietary behaviour (Yousif, Kaddam, & Humeda, 2019). This study had explored the factors on dietary behaviour which can be the factors influencing obesity among healthcare workers. Dietary behaviour was one of the factors explored in this study as shift workers had different dietary behaviours compared to workers with normal working hours. However, only one study in Malaysia, by Coomarasamy et al. (2014), discussed

this issue among shift workers, which included the eating pattern of the type of food eaten and meal skipping. This study intended to expand on more information regarding the factors that influence the dietary behaviour on obesity among healthcare workers.

Several previous studies, including Buss (2012); Lemmens, Rutters, Born, and Westerterp-Plantenga (2011); Mas et al. (2017); Nishitani and Sakakibara (2006); Rutters, Nieuwenhuizen, Lemmens, Born, and Westerterp-Plantenga (2009); Sinha and Jastreboff (2013); Yau and Potenza (2013) showed that stress brought some changes in eating behaviour. Nishitani and Sakakibara (2006) stated that the stressful state in the workplace might affect the eating behaviour of the workers and thus, it may contribute to obesity. However, a review by Ribeiro et al. (2011) on the relationship between obesity and the stress among workers from seven articles showed that there was no significant relationship between obesity and stress. Inconsistent results regarding stress at the workplace and obesity might be due to different categories of respondents. In a more recent study, Coomarasamy et al. (2014) emphasised that it is important to study work-related conditions that may impact stress on workers. This study intended to explore the determinants of job stressors on obesity among healthcare workers.

On the other hand, Nobrega et al. (2016) stated that most interventions focus on individual behaviour and the physical environment, however, they rarely focus on the interventions regarding modifications of the work environment. The study showed that several working conditions were associated with obesity among the low wage workers, including physical job demands and hazards, time pressure, food environment at work, and psychological work stressors (Nobrega et al., 2016). This study intended to explore the factors of working conditions on obesity among healthcare workers.

Based on that, this study intended to add more insights on the factors influencing obesity among healthcare workers. Although shift workers were in the category of work with a high prevalence of obesity in Malaysia, a lack of information is available for the factors influencing obesity among shift workers as the previous studies mostly reported the prevalence of overweight and obesity among shift workers (Ayiesah et al., 2013; Coomarasamy et al., 2014; Hazizi et al., 2012; Hussain et al., 2018; Moy, Hoe, Tan, & Rosmawati, 2010). Therefore, this study intends to explore the factors influencing obesity focusing on dietary behaviour, job stressors, and the role of working conditions among healthcare workers. This study was conducted using a qualitative approach through interviews among healthcare workers.

1.3 Research Questions

Qualitative research is targeted more towards individual behaviour and preferences, thus the research questions of this study were:

- What are the factors influencing obesity among healthcare workers?
- What are the strategies to control obesity among healthcare workers?

1.4 Research Objectives

Qualitative research is targeted more towards individual behaviour and preferences, thus the research objectives of this study were:

- To identify the factors influencing obesity among healthcare workers.
- To determine the strategies to control obesity among healthcare workers.

1.5 Scope of the Study

Datuk Dr. Norhizan Ismail, who is the Health Director of Kedah, mentioned that the NHMS 2015 revealed that the prevalence of diabetes and hypertension in Kedah were the highest in Malaysia with 25.4% or one in four people had diabetes and 37.4% or two in five people had hypertension while hypercholesterolemia was recorded with the third highest number of people at 53.5% (Muhamading, 2017). As Kedah was recorded with the highest prevalence of diabetes and hypertension in Malaysia (Hamid, 2019; Muhamading, 2017), it is important to control the risk factors of NCDs for controlling further increases of NCDs in Kedah. Therefore, controlling obesity is one of the ways to prevent increases in NCDs as WHO (2018b) stated that obesity is a common but modifiable risk factor for major NCDs.

This study used the qualitative approach for data collection and it was conducted through individual semi-structured interviews. The annual report from the Department of Health, Negeri Kedah, in 2012 showed that 33.8% of the healthcare workers in the hospitals had excess weight. This study was conducted with the healthcare workers of two public hospitals in Kedah. The highest number of workers with excess weight was found in Hospital Sultan Abdul Halim with 1105 healthcare workers and Hospital Sultanah Bahiyah with 879 healthcare workers (Jabatan Kesihatan Negeri Kedah, 2012). These two hospitals were chosen as the sites of the study due to the high number of healthcare workers compared to other hospitals. As this study used purposive sampling, high number of potential respondents helped to obtain the respondents who fulfilled all the inclusion criteria for this study.

1.6 Significance of the Study

The Government of Malaysia is highly aware on the rise in the prevalence of obesity in the community and has called for immediate actions to control obesity in Malaysia (Ministry of Health Malaysia, 2016) as the government is aware on the consequences of this growing health problem (Jamaluddin et al., 2015). One of the objectives of the National Strategic Plan for Non-communicable Diseases in Malaysia is encouraging research to control and prevent the increasing trend of non-communicable diseases (Ministry of Health Malaysia, 2016). As obesity can be related with many non-communicable diseases (Jay & Zulkifli, 2016), it is important to find the risk factors and preventive measures for obesity as obesity keeps increasing globally and the same situation is happening in Malaysia.

The practical significance of this study is that it will be beneficial for the employers and the government to develop certain strategies or policies for controlling the increasing trend in the prevalence of overweight and obesity, to ensure the good health status of the workers in Malaysia, and to find solutions on the ways to help the workers with excess body weight. Several interventions and programmes can be constructed to maintain normal body weight among workers.

The significance of this study will also be beneficial in the theoretical aspects. This study refers to two pillars, which are the Social Ecological Model and Health Belief Model (HBM). As this study has been conducted using a qualitative method, this study has allowed new information to emerge from the data collection and thus helps to present a model in which the concept expands from the original Social Ecological Model. The

model provides comprehensive approaches for the whole population in terms of changing behaviours that helps to reduce prevalent and serious health problems (Sallis, Owen, & Fisher, 2008). As the objective of this study was to explore the factors influencing obesity among healthcare workers which included the complex factors influencing obesity, then this model will be helpful as Sallis et al. (2008) stated that this model helps to explain multiple and interacting determinants of health behaviours. In addition, the HBM has been adapted to explain the perceived barriers of maintaining a healthy weight so that the necessary strategies can be developed for weight management at the workplace.

1.7 Definition of Key Terms

1.7.1 Circadian Rhythms

National Institute of General Medical Sciences refers circadian rhythms as the changes in behavioural, physical, and mental that follows according to daily cycle. The circadian rhythm is set by light and darkness of 24-hour daily cycle (National Institute of General Medical Sciences, 2017).

1.7.2 Dietary Behaviour

Dietary behaviour means the eating patterns that people engage in. It also refers to the behaviours which are related to consuming foods, such as portion size, eating out, and type of food purchased (Glanz & Maddock, 2002).

1.7.3 High Energy Dense Food

Food with higher energy density has higher calories per unit weight and it contains higher calories per eating session. High energy dense food contains higher fat content. Besides, food that has higher energy density is associated with higher energy intake per meal (Drewnowski, 1998).

1.7.4 Occupational Stress

The definition of occupational stress is the change of someone's physical or mental state as a response to workplace that appear as a challenge or threat to that employee (Colligan & Higgins, 2005; Mustafa et al., 2015).

1.7.5 Prevalence

Prevalence is the proportion of a population living with a specific health outcome within a specified time. The prevalence can be calculated by dividing the number of prevalent cases (numerator) with the total population at risk (denominator). The prevalent cases will be included in the denominator for the total population at risk. Prevalence is normally reported in the form of percentage (Alexander, Lopes, Ricchetti-Masterson, & Yeatts, n.d.).

1.7.6 Shift Workers

Shift workers can be defined as the workers with working time other than normal working during daytime of approximately 7.00 a.m. to 6.00 p.m. or those who are working during the weekends (Amani & Gill, 2013).

1.8 Organisation of the Thesis

There are five chapters in this thesis which consists of introduction, literature review, methodology, findings, and lastly discussion and conclusion.

Chapter one starts by providing general introduction of this study. It covers the background of study, problem statement, research questions, research objectives, scope of the study, significant of study, definition of key terms, and organisation of the thesis.

Chapter two discusses the literature review which presents the evident relating to the current study. It covers the discussion about the definition of obesity for adults, global obesity, obesity among adults in Malaysia, impact of obesity on workers, obesity among healthcare workers, Malaysian dietary intake, dietary behaviour, job stressors, working conditions, strategies to control obesity, the conceptual framework, and the underlying theory.

Chapter three further discusses the methodologies applied to collect the data for this study. The methodology consists of research design, data collection, population of interest, instrumentation, data analysis, and ethical consideration.

Chapter four describes the findings and analysis of the data collected. It begins with presenting the findings of the transcribed interview according to the themes emerged from the data including about dietary behaviour, job stressors, and working conditions, with additional data on the suggested strategies to control and prevent obesity.

Chapter five finally interprets the overall findings and data analysis of this study. It also includes the limitations of study and recommendations for future study. Finally, chapter five provides general conclusion of this study.

1.9 Chapter Summary

In summary, this chapter showed high prevalence of obesity among adults in Malaysia and in other countries. This chapter also states the underlining research problem on the impacts of obesity towards employers and employees which showed the need to understand the factors influencing obesity. This study intends to address the issue on high prevalence of obesity among healthcare workers in Malaysia. It is important to pay attention on the issue of obesity among healthcare workers because they are the role models regarding healthy lifestyle, promoting health, and preventing diseases (Coomarasamy et al., 2014; Skaal & Pengpid, 2011; Taib et al., 2019) and they have the responsibility to promote healthy lifestyle among general population (Coomarasamy et al., 2014; Sharma et al., 2016). To address this problem, two specific research questions were formulated with three key issues were outlined. It is expected that once these issues are addressed, this study helps to provide several contribution on theoretical and practical aspects regarding obesity among healthcare workers. Next chapter provides the information about the possible factors influencing obesity among workers as reported by the previous studies.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature review of the matters that are included in this study. Firstly, there is an explanation about obesity with a further description about obesity among healthcare workers. Then, there is information on the impacts of obesity on workers. After that, there are details on the factors which might influence obesity among workers that focus on dietary behaviour, job stressors, and working conditions. At the end of this chapter, it will be about the conceptual framework and underlying theory for this research.

2.2 Definition of Obesity for Adults

According to the World Health Organisation (WHO), obesity can be defined as the abnormal or excessive accumulation of fat that presents a risk to health (WHO, 2018a). There is no specific device to measure the severity of obesity. So, the body mass index (BMI) is used to measure the obesity of a crude population. The BMI is calculated by dividing a person's weight (in kilograms) with the square of his or her height (in metres) (WHO, 2000; 2018a).

According to Dinsdale, Ridler, and Ells (2011), the BMI provides a good indicator to determine the level of body fat. It is widely used for population surveys and for assessing individual patients by health professionals as this method is quick and easy to calculate. Besides that, the BMI is the most frequently used method to assess the categories of body

weight for adults whether they have a healthy weight, underweight, overweight, or obese. The classification of the BMI for adults aged above 20 years old uses the same categories which are also known as thresholds or cut-off for identification of normal weight, underweight, overweight, or obesity regardless of the gender and age of the adult. Table 2.1 shows the classification of body weight for adults. The next section further discusses briefly about global obesity.

Table 2.1
Weight Status in Adults According to Body Mass Index (BMI)

Classification	BMI (kg/m^2)
Underweight	<18.5
Normal range	18.5 – 24.9
Overweight:	≥25
Pre-obese	25-29.9
Obese class I	30.0-34.9
Obese class II	35.0-39.9
Obese class III	≥40

Source: WHO (2000) and WHO (2018a)

2.3 Global Obesity

People with BMIs equal to or more than 25 are categorised as overweight while people with BMIs equal to or more than 30 are categorised as obese (WHO, 2000; 2018a). WHO (2018a) also refers to the category of overweight as pre-obese. The BMI is the most useful method to measure overweight and obesity for a population level as it uses the same values and categories for both genders and for adults of all ages (Dinsdale et al.,

2011; WHO, 2018a). In addition, it is easy to measure and is inexpensive although it has limitations as this method is unable to distinguish between body fat and lean body mass (Hu, 2008; Kim, 2016).

In the past, the issue of overweight and obesity was considered as a problem for high-income countries; however, nowadays, overweight and obesity are on the rising trend for low-income countries and middle-income countries, especially in urban areas (WHO, 2018a). Many studies, including Chan et al. (2017); Ghee (2016); Jang et al. (2013); WHO (2018a); and Zainuddin et al. (2016) stated that the prevalence of overweight and obesity is increasing globally. In Malaysia, the prevalence of obesity is high among adults (Ayiesah et al., 2013; Chan et al., 2017; Ghee, 2016; Hazizi et al., 2012; Lee, Norimah, & Ismail, 2010; Zainuddin et al., 2016) and children (Jay & Zulkifli, 2016; Woon et al., 2014). Previous studies, including Gupta, Goel, Shah, and Misra (2012); Hoque et al. (2014); and Naidu et al. (2013) reported that children who are overweight or obese are more likely to be overweight or obese in their adulthood.

The WHO (2018a) revealed that the WHO's global estimates for overweight adults aged 18 years and older in 2016 was more than 1.9 billion and over 650 million of these were obese. In 2016, the global prevalence for overweight was 39% and obesity was 13%. The WHO (2018a) added that the prevalence of worldwide obesity nearly tripled between 1975 and 2016. The WHO (2018a) specified that the energy imbalance between energy intake and energy expenditure may cause overweight and obesity. There have been several changes in the trends worldwide in terms of dietary patterns and physical activity patterns that have occurred due to environmental and societal changes (WHO, 2018a). These include an increase in the intake of energy dense food (Musaiger, 2011; Wang et

al., 2016; WHO, 2018a) and an increase in physical inactivity that have occurred due to urbanisation, many forms of work have changed to being more sedentary in nature, and the change of modes of transportation (Musaiger, 2011; WHO, 2018a). In Southwest China, a similar factor was mentioned by Zhang et al. (2017) which showed that the increased prevalence of obesity was driven by the shift of traditional diets towards diets with food that had high-fat and high-energy contents. Prabhat and Begum (2012) stated that development in technology is a major factor that leads to changes in food consumption over time. The authors also claimed that the predictor for health and nutritional status is the dietary behaviour.

According to Musaiger (2011), the WHO has warned that the increased obesity prevalence all around the world may put the population at a higher risk of developing non-communicable diseases. The increase in the BMI is a major risk factor for non-communicable diseases, such as diabetes, cardiovascular diseases (mainly stroke and heart disease), musculoskeletal disorders, and some cancers (including kidney, liver, ovarian, colon, breast, prostate, endometrial, and gallbladder) (WHO, 2018a). Wang et al. (2016) and Zhang et al. (2017) also indicated that obesity has become a major global health challenge as it contributes to an increased percentage of chronic diseases, such as cardiovascular diseases, diabetes, and cancer.

2.4 Obesity among Adults in Malaysia

Along with the increased prevalence of overweight and obesity worldwide, a dramatic increase in the prevalence of overweight and obesity has also occurred in Malaysia. This situation has happened due to the rapid economic development in Malaysia which has

resulted in a nutrition transition, which is the change in diet from low calorie food to high energy dense food (Ghee, 2016). A similar factor was identified by Khor (2012), where societies have converged their diets to energy dense and processed food with low intakes of fibre, high intakes of fat, and increased intakes of sugar and sweeteners due to the rapid economic growth.

According to Chan et al. (2017), a lower obesity prevalence was reported in Malaysia (11.4% in males, 16.7% in females) compared to Western countries, such as the United States (31.7% in males, 16.7% in females) and Australia (27.5% in males, 29.8% in females) in 2013. However, the prevalence of obesity was almost three to four times higher than in Asian countries, such as India (3.7% in males, 4.2% in females), China (3.8% in males, 5.0% in females), Taiwan (4.3% in males, 6.4% in females), and Japan (4.5% in males, 3.3% in females) in 2013 (Chan et al., 2017). The increasing trend of the prevalence of overweight and obesity from National Health and Morbidity Survey in Malaysia is shown in Table 2.2.

Table 2.2
Prevalence of Overweight and Obesity of Large Malaysian Obesity Studies

	Sample size	Prevalence of overweight (%)	Prevalence of obesity (%)
NHMS 1996	28,737	16.6	4.4
NHMS 2006	33,055	29.1	14.0
NHMS 2011	28,498	29.4	15.1
NHMS 2015	29,460	30.0	17.7

Source: Ghee (2016)

According to Ghee (2016), previous studies that were conducted among workers in Malaysia regarding excess weight included women workers from the electronic factories in Peninsular Malaysia (Chee et al., 2004), working women who were among teachers and government servants in Kuala Lumpur (Poh et al., 2006), women office workers from the Klang Valley (Lee et al., 2010), government employees in Penang (Hazizi et al., 2012), university staff in Selangor (Rampal, Saeedi, Aminizadeh Bezenjani, Salmiah, & Norlijah, 2012), and Military Hospital Staff in Malacca (Ayiesah et al., 2013). It showed that there was a lack of information available for shift workers in Malaysia.

Raberg Kjollesdal, Holmboe-Ottesen, and Wandel (2010) mentioned that occupation is related to dietary behaviour among employees, including the change in food consumption during the work time, lifestyles of colleagues, and social environment. They added that special challenges might be encountered by shift workers regarding to where and what to eat. Then, a systematic review by Amani and Gill (2013) reported that the majority of the cross-sectional study indicated that shift work was related with a higher percentage of obesity and a higher percentage of weight gain. High prevalence of obesity among workers is an important issue because of the impacts it has on workers that will be discussed further in the next subsection.

2.5 Impact of Obesity on Workers

Amani and Gill (2013) mentioned the importance of addressing the issue of obesity in the workplace because it is associated with sick leaves, injuries, absenteeism, disabilities, and healthcare claims. In an earlier study, Schulte et al. (2007) had listed several impacts of

obesity on work performance and work-related diseases. The authors stated that workers with high BMIs had higher short-term absences due to disabilities and illnesses, had additional health risks, and more health care costs compared to workers who were not overweight. Obesity also increases the risk of certain occupational diseases or conditions such as asthma, musculoskeletal disorders, cardiovascular disease, and vibration-induced injury (Schulte et al., 2007). In addition, obesity might alter the physiological responses to neurotoxins and immune responses to chemical challenges which can be found at work. There are also issues regarding safety at work as personal protective devices might be uncomfortable due to the size and there is a higher risk for respiratory problems due to unsuitable filter masks (Capodaglio et al., 2010).

2.5.1 Impact of Obesity on Work

Obesity may also have an impact on direct costs and indirect costs towards employers and employees. Yarborough et al. (2018) stated that medical expenditures, including pharmaceutical costs, as well as productivity metrics, including absenteeism, workers' compensation (WC), short-term disability, and productivity have been found to be associated with the BMI. The greatest impact was seen among those with BMI≥30 kg/m^2. High medical expenses were reported for diabetes related expenditures for individuals with obesity (Breton et al., 2013; Cawley & Meyerhoefer, 2012). In addition, individuals with obesity are also associated with a higher indirect cost of decreased work productivity, including absenteeism and presenteeism (Gates, Succop, Brehm, Gillespie, & Sommers, 2008; Goettler, Grosse, & Sonntag, 2017; Kudel, Huang, & Ganguly, 2018).

Gates et al. (2008) defined absenteeism as the number of days employees are absent from work due to obesity-associated medical conditions while presenteeism is defined as obesity-related loss of productivity on the days at work.

From a health and safety perspective, promoting healthy weights among employees may help to reduce the risk of injuries associated with excess weight, and it helps to maintain a workforce with the appropriate fitness for work (Street & Thomas, 2017). In addition, obesity was associated with a greater rate of injuries at the workplace (Koepp, Snedden, & Levine, 2015; Kouvonen et al., 2013) . Koepp et al. (2015) stated that slip, trip, and fall injuries at the workplace had a great impact on the financial burden of the employers. Kouvonen et al (2013) reported that obesity was associated with a higher risk of fractures, dislocations, sprains and strains, concussions, and internal injuries.

Kouvonen et al. (2013) also stated several possible reasons in which obesity could increase the risk of occupational injuries. Firstly, overall fatigue and sleeping problems which are common among obese people may contribute to the risk of occupational injuries. Secondly, some obese employees generally have poorer health as compared to those with normal weights which results in a higher usage of prescription drugs that leads to an increased risk of injury. Thirdly, excess weight might limit the physical functioning and can hinder gait which leads to higher risks of occupational injuries. The authors further added that weight management and prevention of obesity at the workplace are beneficial for improving the rates of occupational injuries.

Higher medical costs reported among employees with obesity (Biener, Cawley, & Meyerhoefer, 2018; Gifford, 2015). Employees who were categorised as obese had significantly poor productivity outcomes, higher absences due to illness, greater amount of time with work difficulties, and greater medical payments compared to those with healthy weights (Gifford, 2015). Besides that, higher annual cost increase was reported among employees with obesity. Carls et al. (2011) found that employees with high risks for obesity experienced annual cost increases that were 9.9% points higher than those with lower risks. The study stated that, an effective health promotion programme in preventing weight gain is likely to result in cost savings for employers. Likewise, a study by Kuehl et al. (2012) showed that higher compensation claims and higher percentages of injuries for fire fighters with obesity. The body parts most often injured among obese fire fighters were back, elbow, and hand injuries. In addition, significantly higher percentages of obese fire fighters (33.8%) who required a visit to a specialist were found as compared to those with normal weights (12.5%).

2.5.2 Impact of Obesity on Health

On another aspect, Street and Thomas (2017) had listed several health impacts of obesity, including a higher risk of developing chronic illnesses, such as type 2 diabetes, heart disease, and some types of cancers. The objective of the study might help health and safety practitioners in developing workplace weight management programmes that will attract employees (Street & Thomas, 2017). The authors added that, besides providing assistance in improvement of workplace weight management programmes, the objective

of the study might also help to improve organisational productivity and reduce the burden of weight-related chronic illnesses; and, it has a potential benefit on the health of the employees.

Webber et al. (2012) emphasised that overweight and obesity are the key modifiable risk factors for NCDs and thus, there is a need for a policy to reduce the prevalence rates of overweight and obesity in order to control the rising levels of NCDs. Skaal and Pengpid (2011) reported a high prevalence of obesity-related NCDs among the healthcare workers in South Africa with 73% of them having excess weight. About one-third of the healthcare workers reported they had obesity related NCDs (Skaal & Pengpid, 2011). The same study also showed a wider distribution of health problems among those who were overweight, obese, and severely obese compared to those with normal weights.

Several impacts of overweight and obesity were discussed by the previous studies, including higher medical costs (Biener et al., 2018; Carls et al., 2011; Gifford, 2015; Schulte et al., 2007), higher compensation claims (Kuehl et al., 2012), higher occupational injuries (Kouvonen et al., 2013; Kuehl et al., 2012), poor productivity (Gifford, 2015), higher absences (Goettler et al., 2017; Schulte et al., 2007), increased risk of occupational diseases (Schulte et al., 2007), higher indirect cost of decreased work productivity (Gates et al., 2008; Goettler et al., 2017; Kudel et al., 2018), and a higher risk of developing chronic illnesses (Street & Thomas, 2017). Based on the previous studies, it was shown that excess weight (overweight and obesity) had negative impacts on employers and employees. However, more impacts of obesity than overweight on workers were reported by the previous studies, including Carls et al. (2011); Gifford (2015); Kouvonen et al. (2013); Kuehl et al. (2012); and Street and Thomas (2017). Due

to that, this study only focused on obesity among healthcare workers. It is important to identify the factors influencing obesity among healthcare workers as a high prevalence of obesity among healthcare workers was reported by previous studies which is discussed in the next section.

2.6 Obesity among Healthcare Workers

Previous studies reported that shift workers were associated with high BMIs in Malaysia (Chee et al., 2004; Hussain et al., 2018; Moy et al., 2010; Taib et al., 2019), and in other countries (Schulte et al., 2007; Zhao, Bogossian, Song, & Turner, 2011). Besides that, a systematic review conducted by Amani and Gill (2013) on shift working, nutrition, and obesity reported that six out of seven cross-sectional studies and one cohort study showed higher BMIs or higher obesity prevalence among shift workers. Shift workers have been associated with obesity and they have different work routines compared with normal working hours. Therefore, it is important to study the factors at the workplace of shift workers that leads to obesity so that preventive actions can be taken to control obesity among them.

The shift workers chosen as the sample of this study were among the healthcare workers. Although healthcare workers are those who should have good knowledge about health promotion (Skaal & Pengpid, 2011), they also have problems with excess weight as found by Cakmur and Anuk (2017); Coomarasamy et al. (2014); Hussain et al. (2018); Kyle et al. (2017); Sharma et al. (2016); Skaal and Pengpid (2011); and Taib et al. (2019).

Healthcare workers with shift working hours had higher BMIs as compared to day time workers (Peplonska, Bukowska, & Sobala, 2015; Zhao et al., 2011). Peplonska et al. (2015) found that obesity had a significant association with the current status of night shift work and Zhao et al. (2011) also showed that shift workers more likely to have excess weight than day workers. Different factors were reported by Duodu, Awuni, Attito, and Zotor (2015) as the contributory factors towards high prevalence of overweight and obesity among the participants were due to physical inactivity and eating late at night. The study found that 60.7% of the nurses and midwives had excess weight, including 31.9% overweight and 28.8% obese.

In Malaysia, studies by Coomarasamy et al. (2014); Hussain et al. (2018); Moy et al. (2010); and Taib et al. (2019) also reported that healthcare workers had a high prevalence of overweight and obesity. A study by Moy et al. (2010) reported a high prevalence of overweight (42.9% shift workers and 41.6% non-shift workers) and obesity (26.8% shift workers and 21.3% non-shift workers) among nurses and security staff in a public medical centre in Kuala Lumpur. Then, another study that was conducted in Malaysia among healthcare workers by Coomarasamy et al. (2014) among 1086 Registered Nurses in Malaysia, showing that overweight and obesity prevalence among them was 50.6%, with 33.5% overweight and the other 17.1% were obese. The data indicates that the prevalence of overweight and obesity is an emerging issue among nurses. The study claimed that work scheduling and work demand among nurses, especially during busy shifts, may affect their eating patterns (Coomarasamy et al., 2014).

A study by Hussain et al. (2018) was conducted among 131 healthcare workers who were obese to evaluate the effectiveness of a weight reduction programme in a public hospital

in Malaysia. The results showed that the mean reduction in body weight of the participants was 4.47 kg, the mean reduction of the BMI was 1.71 kg/m^2, and about half of them (46.2%) achieved a weight reduction of at least 5%. The results reflect the effectiveness of the programme. The study suggested further research to confirm the sustainability of the health behaviours of the participants following the programme. In a recent study, Taib et al. (2019) found the prevalence of overweight and obesity among healthcare workers was 55.6% and the identified risks of being overweight were those aged forty and above, non-Chinese, married, big family size, underlying NCD, family history of NCD, and sedentary lifestyle.

Based on the previous studies discussed in this part, it was shown that a high prevalence of overweight and obesity was reported among healthcare workers in Malaysia and in other countries. Previous studies by Coomarasamy et al. (2014); Hussain et al. (2018); and Moy et al. (2010) reported a higher prevalence of overweight and obesity among healthcare workers but the studies did not specify the factors that influenced the excess weight of the participants of the study. However, for other studies, different factors were reported to have influence on excess weight among healthcare workers, such as shift work (Peplonska et al., 2015), physical inactivity (Duodu et al., 2015), and eating late at night (Duodu et al., 2015).

Age, ethnicity, marital status, size of family, underlying NCD, family history of NCD, and physical activity were found to be significant predictor for overweight and obesity among healthcare workers (Taib et al., 2019). Further, a recent study by Hussain et al. (2018) stated that obesity among healthcare workers is increasingly prevalent and there is a need to control body weight among them. Therefore, this study intended to expand on

more information regarding this issue by exploring more on the dietary behaviour, job stressors, and working conditions which need to study further among healthcare workers. Before discussing the dietary behaviour, the next section will further explain the Malaysian Dietary Intake as it might help to refer to the recommended intake of certain foods by the Ministry of Health.

2.7 Malaysian Dietary Intake

The Malaysian Dietary Intake 2010 suggests that people should eat a variety of food within their recommended intake (National Coordinating Committee on Food and Nutrition [NCCFN], 2010). It recommends that people must choose their daily food intake based on Malaysian food pyramid, and this can be achieved by choosing food from the five groups in the food pyramid to get the nutrients needed for the human body. It is suggested that, during main meals, people should vary their food choices within each food group. Besides that, it is important to reduce the intake of fats, sugar, salt, oils, sauces, and flavour enhancers such as flavouring cubes or MSG (monosodium glutamate) in cooking (NCCFN, 2010). According to the NCCFN (2010), it is essential to follow the number of servings of daily consumption based on the caloric needs. It is recommended to ensure a variety of food is taken from each food group and vary the food choices in the same food group as they are interchangeable.

The Malaysian food pyramid (see Figure 2.1) is a very useful source to guide people on a variety of food for their intake and they should follow it according to their recommended total daily food servings (Ahmad, Wahab, Hamid, Pardi, & Harun, 2012). Ahmad et al.

(2012) stated that, there is no single food which provides all the nutrients needed in the human body. However, a balanced diet consists of a combination of various foods from different food groups, providing the nutrients that are vital to human body.

Figure 2.1
Malaysian Food Pyramid
Source: NCCFN (2010)

The food pyramid consists of four levels which represent five food groups (NCCFN, 2010). The size of the food pyramid is larger at the bottom and smaller at the top. It indicates that people should eat the food group at the base in a larger amount and eat less of the food group at the top of the food pyramid. In order to maintain a healthy body, people should vary their food intake within each of the food groups in the food pyramid

(NCCFN, 2010). The distribution of the number of servings according to the food groups based on calorie value is shown in Table 2.3.

Table 2.3
Distribution of Number of Servings According to Food Groups Based on Calorie Value

Food group	**1500 kcal/day [1]**	**2000 kcal/day [2]**	**2500 kcal/day [3]**
Cereals and grains	4 servings	6 servings	8 servings
Fruits	2 servings	2 servings	2 servings
Vegetables	3 servings	3 servings	3 servings
Meat/poultry	½ serving	1 serving	2 servings
Fish	1 serving	1 serving	1 serving
Legumes	½ serving	1 serving	1 serving
Milk and dairy products	1 serving	2 servings	3 servings

Note:
[1] Suitable for sedentary women and older adults
[2] Suitable for children, teenage girls, moderately active women and sedentary men
[3] Suitable for teenage boys, active men, very active women and underweight men and women
Source: NCCFN (2010)

A brief explanation about Malaysian dietary intakes has been discussed in this section. In addition, NCCFN (2010) also recommends the consumption of six to eight glasses of plain water daily. The calculation of the water requirement according to the Recommended Nutrient Intake (RNI) for different age groups and gender is shown in Table 2.4. After this, the factors which might influence obesity among workers including dietary behaviour, job stressors, and working conditions will be discussed further.

Table 2.4
Calculation of Water Requirement According to RNI for Different Age Groups and Gender

Gender	Age group	Energy[1]	1 Kcal/ 1 ml Glass[2]
Men	19-29 years	2440	9.8
	30-50 years	2460	9.8
	51-59 years	2460	9.8
	60-65 years	2010	8.0
Women	19-29 years	2000	8.0
	30-50 years	2180	8.7
	51-59 years	2180	8.7
	60-65 years	1780	7.1

Note:
1 Energy based on RNI for Malaysia
2 1 glass = 250 ml
Source: NCCFN (2010)

2.8 Dietary Behaviour

According to Glanz and Maddock (2002) dietary behaviour is defined as the eating patterns that people engage in and it includes the behaviours related with food consumption, for example, eating out, the kind of food purchased, and portion size. Zhao and Turner (2008) stated that modern society is shifting towards a pattern of working twenty-four hours a day. Workers in essential services, such as hospital employees, ambulance officers, fire brigades, and police departments, have always operated throughout twenty-four hours. Increases in weight gain and a higher prevalence of overweight and obesity have been seen among shift workers (Amani & Gill, 2013). Lowden et al. (2010) indicated that shift working is one of the factors that affect the amount eaten, energy distribution of the meals taken throughout the day, and the quality of the dietary intake.

Energy metabolism can be affected by shift work and there might be an increase in weight due to the disruption in the circadian biological clock that helps to govern the time regulation of sleep and wake up time in the human body (Bonnell et al., 2017). The body is in a fasting state during sleep at night time which promotes the release of stored glucose and relative insulin resistance (compared with the day) and allows for preferential usage of glucose by the Central Nervous System instead of using it for muscle energy (Lowden et al., 2010). A qualitative study conducted among paramedics in Australia identified several factors that may influence the dietary behaviour among shift workers including psychosocial influences, physiological influences, the organisational environment, and the physical environment (Anstey, Tweedie, & Lord, 2016). Next, some of the factors of dietary behaviours which might influence obesity among shift workers will be discussed.

2.8.1 Food Choice

Food choice refers to the way people decide on what to buy and eat and it can be influenced by many factors, including social and cultural factors (Shepherd, 1999). Shift work at night causes a conflict with meal schedules which is determined by social context and there are also conflicts on the circadian biological rhythms in hunger, satiety, and metabolism (Lowden et al., 2010) which supported that nocturnal eating may cause disturbances of absorption, intestinal mortality, and utilisation of nutrients; it also affects digestion (Roenneberg & Merrow, 2003). Lowden et al. (2010) further explained about diurnal eating from a chronological perspective. That is, the human species is diurnal, which means that they are active during the day. This condition might be the reason that

night workers tend to lose their appetites during the night shift as their body is programmed for fasting, restitution, and the endogenous mobilisation of blood glucose.

In addition to the endogenous factors underlying unhealthy food choices, there are several exogenous contributors that might be related to food choice (Lowden et al., 2010). They include the absence of social influence on eating, such as eating with family members and the availability of tasty, cheap, and energy-dense food that is available twenty-four hours a day. It shows that eating may be facilitated and promoted anywhere, at anytime. The authors added that this situation may encourage a snacking or grazing behaviour, which means that people eat continuously and spontaneously instead of maintaining a pattern of planned and regular eating events.

Another aspect was explained by Lowden et al. (2010) from the psychosocial perspective that shift workers normally experience mismatched activities with their family members and friends, including their meal times which might lead to an alteration in food choice. However, the study by Lowden et al. (2010) only described the dietary behaviours among shift workers and did not relate it to the high obesity rates among shift workers due to their dietary behaviours.

Shift workers also tend to have irregular eating patterns (Freitas et al., 2015; Lowden et al., 2010, Yoshizaki et al., 2016), however these studies did not relate with obesity. Irregular eating patterns could be the factor that contributes to higher energy intakes among night shift workers (Lowden et al., 2010). The dietary behaviours of the rotating shift workers might be influenced by their diurnal preferences as they were related to the

consumption of imbalanced diets and more abnormal temporal eating patterns (Yoshizaki et al., 2016).

Besides that, shift workers had higher preference towards diets higher in fat content (Antunes, Levandovski, Dantas, Caumo, & Hidalgo, 2010; Cain, Filtness, Phillips, & Anderson, 2015; Yoshizaki et al., 2016) and higher consumptions of snacks (Antunes et al., 2010; Bonnell et al., 2017; Tada et al., 2014). The respondents added that the reasons for the preference of discretionary snacks at night were because of habit and a lack of healthy alternatives (Bonnell et al., 2017) and it becomes a concern considering the time the snacks are taken (Antunes et al., 2010). However, different factor was reported by Cain et al. (2015) that the simulated night shift led to the preference towards food with high fat contents. The authors added that sleep restriction and circadian misalignment may result in signals for an increased appetite and decreased satiety. This condition may lead to the preference for high fat food items among shift workers.

Another factor was reported by Fan and Jin (2013) who conducted a study to test the differences in self-control capabilities between normal-weight and obese individuals. The study reported lower self-control capabilities among obese individuals compared to their normal-weight counterparts. Besides that, the study also found strong associations between the lack of self-control with poor eating and exercise behaviours, as well as increases in both the BMI and obesity risk.

On the other hand, some previous studies discussed about knowledge and food choice. A study by Van den Berg, Okeyo, Dannhauser, and Nel (2012) reported a high prevalence of overweight and obesity among the nursing students and most of the participants did

not know the recommended number of servings for fruits and vegetables that should be consumed. The participants also showed high intakes of fat and sugar or sweets despite knowing these foods should be consumed sparingly. They also had inadequate knowledge on key nutrition issues and poor eating habits. In accordance with that, a study by Yahia, Brown, Rapley, and Chung (2016) found that students with a greater nutritional knowledge consumed fewer unhealthy fats. The results showed the role of nutrition education as a potential way to promote healthy eating patterns. In a recent study, Yousif et al. (2019) reported there is a significant relationship between eating behaviours and BMI. Although the study was conducted among medical students, they showed low physical activity level and unhealthy eating behaviour. The study encourages implementation of health education programs about risk factors of obesity among medical students.

In Malaysia, a study by Ardzi, Shariff, Omar, Ramli, and Isa (2014) among nurses reported that the participants had the knowledge but did not follow a healthy lifestyle and the participants showed high percentages of excess weight. Both studies by Van den Berg et al. (2012) and Yahia et al. (2016) discussed knowledge and food choice, however, both of the studies conducted among students and showed lack of information about this issue among the workers. The study by Ardzi et al. (2014) was conducted among nurses, but the study indicated that the nurses had knowledge regarding obesity but they did not follow healthy lifestyles without specifically relate it with food choice.

On the other hand, several previous studies, including Daniels and Popkin (2010); Milla-Tobarra et al. (2016); and Vij and Joshi (2014) showed the influence of water on eating and on body weight. A systematic review by Daniels and Popkin (2010) found that

drinking sugary drinks instead of water was shown to increase the total energy intake with the subsequent meal in adults. The authors reported that water plays an important role in reducing energy intakes and obesity prevention.

Then, a study by Milla-Tobarra et al. (2016) found that a higher consumption of water was negatively associated with BMI. The authors also showed that individuals with overweight or obesity had lower intakes of water; however, the study was conducted among children only. The study further added that water consumption can be associated with many health benefits and its adequate intake could contribute to the prevention of obesity. In addition, Vij and Joshi (2014) stated that drinking 1.5 L of excess water had an impact on body weight reduction, body fat reduction, and appetite suppression among the overweight female participants.

Previous studies regarding the factors of food choice which may influence obesity among shift workers showed that some of the previous studies revealed that shift workers had higher consumptions of snacks or higher consumptions of food with high fat contents (Antunes et al., 2010; Cain et al., 2015; Tada et al., 2014; Yoshizaki et al., 2016); while some of the studies reported that shift workers tended to have irregular meals throughout the day (Lowden et al., 2010; Yoshizaki et al., 2016). In addition, only one study by Tada et al. (2014), reported the high consumption of sugar sweetened beverages and low consumption of fruits and vegetables among those who worked shift hours. However, the studies by Cain et al. (2015); Lowden et al. (2010); and Yoshizaki et al. (2016) did not relate dietary behaviour with obesity. Several studies, such as Daniels and Popkin (2010); Milla-Tobarra et al. (2016); and Vij and Joshi (2014), showed the influence of water intake on eating and body weight, however, the studies did not relate it with shift

workers. Different types of food choices were shown by the previous studies, and this study seeks to find the current food choices by shift workers, specifically among healthcare workers, which might influence obesity among them.

2.8.2 Source of Food

Economic growth in Malaysia has influenced continuous increases of the consumption of food away from home (FAFH) among Malaysians, which has been occurring along with urbanisation and income enhancement (Ishida, Law, & Aita, 2003). Malaysians prefer to eat out more frequently and it happened due to the increase in the busy work schedules of modern society in Malaysia (Siew Heng & Khee Guan, 2007). It becomes a concern because eating food away from home is typically high in sugar, calories, sodium, fat, and monosodium-glutamate (MSG) contents (Siew Heng & Khee Guan, 2007). The trend of eating out also might influence health conditions; as Berg et al. (2009) stated that, the large portion size prepared outside the home might contribute to overweight and obesity.

The Malaysian society is going through a rapid modernisation process that is characterised by urbanisation and this condition has affected the changes in food consumption among Malaysians (Ali & Abdullah, 2012). Ali and Abdullah (2012) emphasised that eating out may have health implications for the practitioner which could be due to over eating, imbalanced diets, late eating, irregular eating, and eating at unclean premises. Some studies, including Boon (2014); Lim et al. (2003); Siew Heng and Khee Guan (2007); and Tan (2010), reported the pattern of the consumption of food away from

home among Malaysians. Glanz and Maddock (2002) refer to eating out as a dietary behaviour.

A qualitative study about obesity and dining out by Boon (2014), which was conducted among participants who lived in an urban area in Malaysia reported that the male participants chose to eat out because eating out was more convenient as their mothers or wives did not have time to cook, however the study did not relate with shift work. The author recommends expanding the research scope as the study was conducted in Kuala Lumpur, which is Malaysia's largest city and the findings may not reflect the other areas of the country. Therefore, the author suggested a similar research can be carried out in other areas, including both urban and rural areas. This study is planned on adding information regarding the dining out behaviours among healthcare workers in Kedah, which is located in the northern part of Malaysia.

Research was conducted by Lim et al. (2003) among women working in the electronic factories in Selangor, Malaysia. It showed that the participants of the study who were among the shift workers had frequently consumed high fat food and their diets lacked variety, which could have been due to the nature of their work. The women who engaged in working during the day time had no time to cook during the day except for dinner. In different circumstances, the shift workers and overtime workers preferred to buy cooked food as they might be too tired to cook after the end of their work period. This explains the reason that the participants of the study preferred having their meals at restaurants, the canteen at the factory, or hawker stalls.

A systematic review by Bezerra, Curioni, and Sichieri (2012) assessed the association between eating out and body weight among adults over 18 years old, and most of the studies in the review were carried out in the United States. The authors stated that the frequent habit of eating out might have influence on increases in weight. A possible explanation for this include the large portion size, high fat content, energy density, and excessive amount of sugar and sugar-sweetened beverages. The overconsumption of energy can also be influenced by inexpensive foods that are readily available.

In addition, a case study was conducted by Arora, Chawla, and Bansal (2014) had listed several factors that may influence the growth of eating out habits, including hectic lifestyle, limited time for preparing food, good economic condition, more variety of food, and more tempting to eat out because more eating outlets are available that can be found in shopping centres, leisure venues, and along the streets. The practice of eating out has health implications under certain circumstances, such as imbalanced diet, irregular eating, overeating, and eating at unclean premises (Arora et al., 2014). The above studies showed that the workers often chose to eat out due to busy schedules, and only one study, by Lim et al. (2003), related this behaviour among shift workers. Several previous studies, including Arora et al. (2014); Bes-Rastrollo et al. (2010); and Bezerra et al. (2012) stated that foods obtained other than from home contained high fat contents. However, limited information regarding this issue is available on this behaviour among shift workers.

2.8.3 Emotional Eating

Emotional eating or also known as emotional hunger is the consumption of food as a response to negative emotions, instead of a way to satisfy hunger it is more applicable as a way to deal with negative feelings (Mas et al., 2017). Emotions may influence what type of food people consume and the way they eat. Emotional reasons related with occupational stress may act as a trigger for unhealthy eating patterns where overeating may lead to excess weight. For example, some people have eaten chocolate after dealing with any conflict or stressful situation, while others have eaten an entire bag of potato chips out of worry or nervousness. Unfortunately, if this eating behaviour becomes a habit then emotional eating may lead to excess weight. The common eating patterns related to unhealthy eating behaviours are grazing, binge eating, late night eating, and food addiction (Mas et al., 2017).

Grazing is an abnormal eating pattern that involves consuming small amounts of various kinds of food almost constantly (Mas et al., 2017). It is often related to emotions, such as anxiety and sometimes it happens out of boredom or not having anything else to do. This is in contrast to binge eating, in which the person feels bad about the way they consume food, grazing makes the person feel pleasure from eating and they enjoy eating more and more.

According to Mas et al. (2017), the other abnormal eating pattern is binge eating also known as “uncontrolled eating” or “compulsive overeating”. Binge eating involves consuming large amounts of food which usually consists of food that is mostly avoided in the person’s normal diet. It might happen in a certain period of time with or brought on by emotional factors like tenseness, anxiety, frustration, and dissatisfaction, and with a

feeling of lack of self-control. After binge eating, the person feels guilty and sad because of their lack of self-control. People who undergo binge eating episodes usually tend to have excess weight. Next, another abnormal eating pattern is late night eating. Late night eating is similar to binge eating, however, it involves consuming large amounts of food in the middle of the night (Mas et al., 2017). In addition to dietary restrictions, stress and bad moods are the risk factors of this eating pattern. People with the late night eating syndrome tend to be overweight or obese.

The last abnormal eating pattern explained by Mas et al. (2017) is food addiction. Food addiction involves eating certain kinds of food almost systematically without planning the amount of that specific food that is going to be consumed before the person starts eating. Some of the addictive foods are chocolate, cookies, French fries, and others which help to produce good feelings. At certain times, with negative emotional impact, these kinds of food tend to become favourites for overeating and binge eating.

A study conducted by Mas et al. (2017) found that the women tended to eat more when they felt bored (44.2%), depressed (29.2%), frustrated (28.8%), and sad (23.7%). In addition, feeling nervous or tense led the participants of the study to eat more, including both men and women. The study indicated that stressful situations related to the work environment may have triggered negative emotions which then affected the eating behaviours in a way that some of the workers tended to eat more while some of them tended to eat less. Mas et al. (2017) added that out of the four unhealthy eating patterns, a significant number of workers reported grazing all day and binge eating once or more per day. There were 45.8% of the participants who were overweight (15.9%) and obese (29.9%) as a consequence of unhealthy eating patterns, including grazing and binge

eating (Mas et al., 2017). The authors also stated that emotional eating can be a barrier to lose weight and to reduce obesity.

In addition, Groesz et al. (2012) reported that stress was related to various indices of the increased drive to eat, including binge eating, disinhibited eating, and higher frequency of consuming highly palatable food items, such as chips, hamburgers, and soda. A systematic review by Dallman (2010) about stress-induced obesity and the emotional nervous system showed that stress and emotional networks may alter eating behaviours in such a way that might lead to obesity. The author indicates that stress may induce the secretion of glucocorticoids that promote higher motivation for food and insulin, which increase food intake and lead to obesity. There is a reduction in the activity of the stress-response network by pleasurable eating, reinforcing the feeding habit.

Stress becomes a challenge to the natural homeostasis of an organism. There is a physiological response to regain the lost equilibrium as a reaction to stress. One such type of homeostasis that is disrupted is eating behaviour (Yau & Potenza, 2013). Wallis and Hetherington (2009) stated that high stress may increase undesirable behaviours, such as certain types of food being consumed as a way to manage the stress. High levels of stress lead to changes in eating behaviours, leading, in turn, increases in the consumption of highly palatable (high sugar, high fat) food (Sinha & Jastreboff, 2013). The consumption of high amounts of such food might contribute to the development of obesity and increases in weight gain.

Sinha and Jastreboff (2013) also reported that acute stress (any stress an individual endures for a short period of time) significantly alters eating habits. The authors

mentioned that acute stress may cause a decrease in food intake, but in contrast, this condition may also lead to an increase in food intake, especially when there is an availability of highly palatable food. The authors added that the risk of obesity might increase due to repeated stress, and individuals with higher BMIs might be more vulnerable to consume stress-related foods. Stress may affect eating behaviours and food preferences, such as binge eating, and increased consumption of snacks, fast food, calorie dense food, and highly palatable food (Buss, 2012; Rutters et al., 2009; Sinha & Jastreboff, 2013; Tomiyama, Dallman, & Epel, 2011). The condition of having high stress contributed to the drive to consume such types of food (Tomiyama et al., 2011). Likewise, the greater emotional eating is, the greater the desire for chocolate consumption and avoid social situations related to food and body exposure (Brytek-Matera, Czepczor-Bernat, & Olejniczak, 2018). It becomes a concern because the added sugar that can be found in highly palatable food contain calories without nutritional value (Buss, 2012). Overconsumption of sugar and sugar-sweetened beverages might cause weight gain and obesity as the overconsumption of such food causes the addition of extra calories in the diet (Johnson et al., 2009).

In a study by Lemmens et al. (2011) found that the healthy lean participants of the study showed decreased energy intakes and mean food cravings in response to both stress and rest conditions in the absence of hunger. In contrast, the same study reported that the overweight participants had higher energy intakes of highly palatable food, such as desserts and snacks, with higher mean food cravings when under stress compared to during rest in the absence of hunger. It might be potentially used as a mechanism to regulate and suppress stress (Lemmens et al., 2011). Similar results were reported by

Block, He, Zaslavsky, Ding, and Ayanian (2009) who found that individuals with high BMIs reported having stronger associations between chronic stress and weight gain as compared with individuals with low BMIs with similar degrees of stress.

According to Yau and Potenza (2013), highly palatable food is the food that contains high amounts of fat and sugar, and these kinds of food may possess addictive qualities. The authors stated that stress is an important factor towards addictive behaviour on certain types of food which may contribute to an increased risk for obesity. Yau and Potenza (2013) also reported that a shift towards choosing more palatable and pleasurable types of food was observed without including the changes of caloric intake during stress. The authors added that, the favourable types of food which are typically consumed during periods of stress are those that contain high fat and sugar. They also stated that stress might lead to irregular eating patterns and it might also lead to overeating. In line with that, Gibson (2006) also found that those people under chronic stress tended to eat more.

On the other hand, a longitudinal cohort study in the United States by Block et al. (2009) found that approximately 40% of the participants of the study had increased caloric intakes when stressed while about 40% of them had lower caloric intakes during periods of stress. The remaining 20% of the participants were reported as having no change in their eating behaviours when stressed. The results variances might be related to different types of stressors and different levels of hunger and satiety before conducting the study, and the duration of the stress provocation (Block et al., 2009).

Previous studies showed that stress may cause emotional eating which might result in several abnormal eating patterns. These types of eating patterns may lead to the

overconsumption of food which might lead to overweight and obesity. As stated by Mas et al. (2017), occupational stress may result in emotional eating in which there is an alteration in eating patterns that may result in excess weight among shift workers. Although many previous studies, including Buss (2012); Rutters et al. (2009); Tomiyama et al. (2012); and Yau and Potenza (2013), reported that stress led to the consumption of energy dense food. Only Mas et al. (2017) found that the participants with emotional eating had excess weight. This study has intended to expand more information regarding stress and obesity among healthcare workers.

Besides stress, shift work can also be a factor that leads to emotional eating. A study in Hong Kong revealed that about 60% of the nurses reported having abnormal eating behaviours, including emotional eating (eating as a response to negative emotion), attempts to refrain from eating with the concern about weight, and externally induced eating (eating as a response to the presence of food) (Wong, Wong, Wong, & Lee, 2010). The study found that the participants who worked during the night shift were more likely to eat in response to negative emotions, attempt to refrain from eating, and overeat as compared to those who worked during the day shift; however, the study did not relate any of this with obesity. The researchers in the study referred to working shifts as working at night.

On the other hand, a study by Degirmenci, Kalkan-Oguzhanoglu, Sozeri-Varma, Ozdel, and Fenkci (2015) was conducted to investigate the relationship between the levels of depression and anxiety symptoms with the quality of life and self-esteem in people with obesity. The study found that depression and anxiety levels were high among individuals

with obesity. The study also showed that the psychological symptoms had negative effects on the quality of life, self-esteem, and eating attitudes.

In summary, previous studies showed that different dietary behaviours among adults and shift workers might be due to the different environment and job categories involved in the studies. This study intended to explore the dietary behaviours of shift workers who were among healthcare workers. It is important to explore the factors of the dietary behaviours that have influenced obesity among the healthcare workers in order to identify the preventive strategies that can be made to prevent the higher prevalence of obesity among them. This section has discussed emotional eating due to stress that might lead to obesity. It is important to know the job stressors as stress can affect behaviour by consumption of foods with high calories, fat, or sugar; by inducing overeating; by decreasing physical activity, and by shortening sleep which might leads to obesity (Tomiyama, 2019). The next section further discusses job stressors that might happen at the workplace which might be the determinants of obesity.

2.9 Job Stressors

Sinha and Jastreboff (2013) defined stress as the process that is highly uncontrolled, overwhelming, and challenging towards emotional or physical events that involve the process, either adaptive or maladaptive, for regaining homeostasis or stability. In addition to that, occupational stress refers to harmful physical and emotional responses that have happened when the job demand has been mismatched with the resources, capabilities, and needs of the workers (National Institute of Occupational Safety and Health [NIOSH],

1999). A similar definition was given by Yadav and Kiran (2015) who stated that occupational stress is stress at work and it happens when the demands of the workplace have a disequilibrium effect on the ability of an individual to carry out and complete these demands. Over the last decade, occupational stress and workplace health has become a great concern around the world (Yadav & Kiran, 2015). The duration of time spent at the workplace and the alteration on the nature of the work have recently been among the factors that have made work stress increase.

Mustafa et al. (2015) listed several causes of occupational stress, generally, without the particular specification of any occupation. The causes of occupational stress are job demands, organisational climate, and environments, including working conditions, workload, extended working hours, workplace conflicts and bullying, position in the workplace, and financial factors. In an earlier study, the job stressors among hospital staff were reported by Tsai and Liu (2012), including among nursing staff (48.5%), administrative staff (32%), medical technicians (15%), and physicians (4.5%). The study was undertaken to examine the factors which were associated with the stress at work among hospital staff. The study found that the factors which were associated with development of the symptoms related to stress included the high demands of the work, low levels of social support, and little decision-making authority. The study also reported that the participants with longer working times had more stress-related symptoms.

In addition, an article by Faghri and Mignano (2013) about overweight and obesity in high stress workplaces listed several common stressors among the correctional officers, which were shift work, work overload, lack of recognition, low social support, as well as job-demand-control imbalance, effort-to-reward-imbalance, and overtime. Further,

Nobrega et al. (2016) stated that the participants of their study who were among low-wage workers reported that several job stressors were related with the mental and social aspects of their work, including low levels of social support, such as poor relationships with co-workers, high and conflicting demands, and low job control, especially over their work schedules. High demand and low autonomy affected the time available to eat during the workday which then affected their eating behaviours. The respondents of the study added that as a consequence of the stress, they tended to consume more food overall or they tended to choose energy-dense comfort food.

In addition, Hatzenbuehler, Keyes, and Hasin (2009); and Hayward, Vartanian, and Pinkus (2018) reported that individuals with obesity who experienced weight discrimination were more vulnerable to stress symptoms. Previous studies reported that weight discrimination promoted weight gain (Jung, Spahlholz, Hilbert, Riedel-Heller, & Luck-Sikorski, 2017) and increased the risk of obesity (Sutin & Terracciano, 2013). In recent studies, Jackson and Steptoe (2017) found that individuals who experienced weight-based discrimination were less physically active while Vartanian and Porter (2016) stated that individuals with weight discrimination reported less healthy eating behaviours. However, no previous studies have related weight discrimination and stress at the workplace.

An article by NIOSH (2008) reported that occupational hazards in hospitals were related with occupational stress. The article had listed several job stressors at the workplace that may result in stress, including job or task demands (lack of control, work overload, and role ambiguity), financial and economic factors, organisational factors (unfair management practices and poor interpersonal relations), poor organisational climate

(conflicting communication styles), training and career development issues (lack of opportunities for growth and promotions), and conflict between work and family roles and responsibilities (NIOSH, 2008). Job stressors varied within occupations and they even varied among healthcare occupations, depending on the tasks being performed (NIOSH, 2008). Table 2.5 shows several factors which were linked with stress according to NIOSH (2008), which referred to a broader category which were health care settings and two occupations, including nurses and physicians. On the other hand, Table 2.6 shows the sources of work stress, in general, without specifying any particular occupation by Cox, Griffiths, and Randall (2002).

Table 2.5
Causes of Occupational Stress

Categories	Job stressors
Health care settings	Shift work, long working hours, role ambiguity, inadequate staffing levels, exposure to infectious and hazardous substances.
Nurses	Time pressure, work overload, lack of social support at work, sleep deprivation, role ambiguity and conflict, dealing with difficulty or seriously ill patients, exposure to infectious diseases, needle stick injuries, exposure to work-related violence or threats, career development issues, understaffing.
Physicians	Long hours, dealing with death and dying, interpersonal conflict with other staff, patient expectations, threat of malpractice litigation, excessive workload.

Source: NIOSH (2008)

Table 2.6

Summary of Stress-related Hazards

Category	Hazardous conditions
	Content of work
Job content	Lack of variety or short work cycles, under use of skills, continuous exposure to people through work, high uncertainty, fragmented or meaningless work.
Work load	Work overload or under-load, time pressure, often subject to deadlines.
Work schedule	Inflexible work schedules, shift working, night shifts, unpredictable hours, long or unsociable hours.
Control	Low participation in decision making, lack of control over workload, lack of control on shift work, etc.
Environment and equipment	Poor environmental conditions such as excessive noise, poor lighting, lack of space; inadequate equipment availability, maintenance or suitability.
	Social and organisational context to work
Organisational culture and function	Poor communication, low levels of support for problem solving and personal development, lack of definition or agreement on organisational objectives.
Interpersonal relationships at work	Lack of social support, interpersonal conflict, poor relationships with superiors, social or physical isolation.
Role in organisation	Role ambiguity, role conflict, and responsibility for people.
Career development	Poor pay, low social value of work, job insecurity, under promotion or over promotion, career uncertainty
Home-work interface	Conflicting demands of work and home, low support at home, dual career problems.

Source: Cox et al. (2002)

Luckhaupt, Cohen, Li, and Calvert (2014) stated that a stressful work environment was associated with an increased prevalence of obesity. Furthermore, Coomarasamy et al. (2014) emphasised that there is a need to study work-related conditions at hospitals which might impact on the stress among nurses. This study helps to explore work-related conditions at the hospital which might impact on the stress among the healthcare workers with obesity and study if the stressors might have any influence on the obesity among them. This section has discussed several sources of stress at the workplace. The next section further discusses the conditions at the workplace which might influence obesity among healthcare workers.

2.10 Working Conditions

Working conditions can be a factor that places the workers at risk in development of certain health problems (NIOSH, 2008). According to Sun et al. (2018), approximately 20% of the overall workforce across the world is involved in shift work patterns and that amount is approximately equivalent to 0.7 billion workers. A meta-analysis conducted by Sun et al. (2018) showed that a higher risk of overweight and obesity was found for night shift workers. Sun et al. (2018) emphasised that the arrangement and characteristics of the night shift work varied according to the different companies and industries, which make it difficult for an overall risk assessment. Healthcare workers, including nurses, physicians, medical technicians, and administrative staff experience high levels of stress due to long working hours, time pressure, and heavy workloads (Tsai & Liu, 2012).

Higher rates of obesity can be found among hospital workers, especially those in the lower income category (Sharma et al., 2016). Shift work can be associated with disrupted sleeping pattern and overweight status (Costa, 2010; Gildner, Liebert, Kowal, Chatterji, & Josh Snodgrass, 2014; Han, Trinkoff, Storr, & Geiger-Brown, 2011). In addition, Knutson (2010) stated that irregular schedules, such as night shift work or rotating shift work, may influence the duration of sleep and quality of sleep with several consequences towards physiological and behavioural factors, such as fatigue, alterations in metabolism, higher risk towards injury, chronic health problems, and disrupted social routines. The researcher added that insufficient sleep can be associated with alterations in appetite and satiety regulation, metabolism, insulin sensitivity, as well as fatigue, which results in the reduction of energy available for engagement in physical activity.

A study by Nobrega et al. (2016) was conducted to determine the role of working conditions towards excess weight among lower income workers. The study identified four themes, including physically demanding work, psychosocial work stressors, food environment at work, and time pressure. Nobrega et al. (2016) reported that the respondents of the study had discussed the options of the food available at their workplace and the physical aspects in the workplace. They said that inadequate eating facilities at their workplace in which no equipment, such as microwave and refrigerator, or insufficient equipment was provided to accommodate those who intended to use it during their short duration of break time. The next subsection further discusses several factors of working condition which might influence excess weight among shift workers.

2.10.1 Work Schedule

Markwald et al. (2013) indicated that changes in hormone levels, such as leptin, ghrelin, and melatonin among nurses working the night shift become possible risks for obesity. Melatonin is the hormonal messenger of the biological clock in the human body that functions to regulate the timing of sleep. In humans, the level of melatonin is higher at night and lowest during the day, in which, according to circadian clock, it promotes wakefulness at that time. Day sleepers receive inadequate duration of sleep and poor sleeping quality as well as having difficulty falling asleep (Eberly & Feldman, 2010). The researchers also added that the majority of night shift workers have approximately 5 hours of sleep and a shorter duration of daily sleep may cause adverse health effects, including obesity.

Ghrelin is a hormone produced by the stomach which is responsible for stimulating appetite (Marqueze, Lemosa, Soaresa, Lorenzi-Filhob, & Morenoa, 2012). Before meals, ghrelin levels are increased, while the levels decrease after meals. Marqueze et al. (2012) stated that shift workers who worked at night have increased levels of ghrelin that happens due to the circadian misalignment, which then leads to overeating and increasing their risks for obesity. On the other hand, Wong et al. (2010) explained that leptin is the hormone that helps one to feel full. However, the level of leptin decreases among shift workers working at night due to the circadian misalignment which makes the shift workers not feeling full or satisfied after eating. This condition might cause them to crave foods high in sugar and carbohydrates that leads to an increased risk of obesity.

In accordance with that, Scheer, Hilton, Mantzoros, and Shea (2009) indicated that sleep disturbance might cause appetite hormones to be imbalanced, resulting in increased

feelings of hunger and metabolic changes. In addition, Costa (2010) stated that shift workers reported having problems with their sleeping patterns, with a poor quality of sleep and a short duration of sleep which are caused by shift work, and this might lead to weight gain. It is difficult to adapt to new sleeping patterns as only a minority of night shift workers, at less than 3%, reporting that they could adapt their circadian rhythm to nocturnal activities after a prolonged exposure to working the night shift (Sun et al., 2018).

On the other hand, Fogelholm et al. (2007) stated that short durations of sleep may lead to fatigue which, in turn, may decrease the physical activity levels. This was supported by a recent study from Nobrega et al. (2016) which stated that the physical demand at the workplace becomes a challenge for engagement in physical activities during the leisure time of many workers due to fatigue. In relation to that, a study by Sharma et al. (2016) among hospital workers of six hospitals in Texas showed that 78.2% were overweight (28.5%) and obese (49.7%). The study revealed that 65.6% of the participants of the study reported no days with vigorous physical activity and 48.4% of the participants of the study reported no days with moderate physical activity in the previous week while at work. It showed that the majority of the participants had excess weight and most of them did not get involved in any vigorous physical activity, and nearly half of them did not get involved in any moderate physical activity.

The risk of obesity among adults can be linked to specific occupations and industries (Luckhaupt et al., 2014). The study stated that a cumulative working time of more than 40 hours per week was related with a higher development of obesity. Han et al. (2011) claimed that hospitals were stressful environments as they are challenged with working

shift hours and operating for 24hours a day. The researchers added that the healthcare workers who needed to work shifts and long working hours were more likely to be obese because there were alterations in their metabolism, body regulation, and stress.

A previous study by Tsai and Liu (2012) in Taiwan showed that the hospital staff with longer working hours had poor intakes of nutrition, which indicates that time pressure at the workplace interfered with their dietary behaviours. The study related long working hours and poor dietary behaviour without directly linking them with obesity. Conversely, a direct link between long working hours and obesity was shown by Ko et al. (2007) among low income workers in Hong Kong. They found that the participants of the study with the average daily working time of 11 hours (±1.38) had greater BMIs. However, the study did not mention a specific occupation and did not include shift work. Fogelholm et al. (2007) further explained that long working hours may reduce the time for involvement in higher levels of physical activity and those who worked longer hours have low physical activity levels due to fatigue. In line with that, a study by Di Milia and Mummery (2009) in Australia found that long working hours was the most significant predictor of obesity. The researchers added that a possible explanation for the relation of longer working hours with obesity is that it might have interfered with several activities, such as exercise, sleep, and social demand, for example, meeting with family members.

A similar context was discussed in a study by Bushnell, Colombi, Caruso, and Tak (2010) which found that different durations of average working hours showed different degrees of the risk of obesity among the shift workers, with those who worked longer hours of 12-hour rotating shifts or 10-hour permanent night shifts having higher risks compared to other shift work schedules. Although the study involved several

occupations, with different shift work, and did not mentioned which occupation was related with obesity, it can be concluded that long working hours have higher risks for obesity. Similarly, Caruso (2014) stated that regardless of the worker's involvement in a shift work schedule or not, the workers with long working hours exhibited higher risks for obesity and type 2 diabetes mellitus.

Further, a qualitative study by Nobrega et al. (2016) reported that some of the respondents complained of time pressure due to the time available to complete their job tasks becoming a challenge for them as the time available for them to eat healthy types of food was limited. The respondents also reported that as they had to do multiple jobs, including the arduous commuting times and responsibilities for their families, then the time available became a challenge for them to prepare healthy meals and to be involved in more moderate or rigorous physical activities in their daily routines. This section showed several factors due to work schedule that might be the determinants of obesity, including hormonal factors (Markwald et al., 2013; Marqueze et al., 2012; Scheer et al., 2009; Wong et al., 2010), sleeping patterns (Costa, 2010), fatigue (Fogelholm et al., 2007; Nobrega et al., 2016), low physical activity (Sharma et al., 2016), and long working hours (Bushnell et al., 2010; Caruso et al., 2014; Di Milia & Mummery, 2009; Han et al., 2011; Ko et al., 2007; Tsai & Liu, 2012). The next section describes the food environment at the workplace which might have affected the dietary behaviours among the shift workers from the previous studies.

2.10.2 Food Environment at the Workplace

The results from a study by Sharma et al. (2016) stated that there is a need for participating hospital worksites to provide healthy environments in the hospitals to effectively address obesity among their employees. Obbagy and Essery (2012), in line with that, mentioned that the food and beverages people consume in their daily lives can be influenced by their environment. Despite individuals having their own preferences of choosing the food they want to eat, it still also depends on what is available in their environment, such as the worksites, stores, and restaurants. Obbagy and Essery (2012) added that the food environment is associated with dietary behaviour. It was found that low intakes of fruits and vegetables are related with higher body weights.

Co-workers' influence at the workplace also may influence health in both positive and negative ways (Bonnell et al., 2017; Persson & Martensson, 2006). Possible reasons could be that the nurses craved for junk food or discretionary items when their colleagues were eating them and the nurses often shared the meals together (Persson & Martensson, 2006). In Melbourne, a study by Bonnell et al. (2017) among fire fighters showed a group culture not only while performing their duties at work, but they also practiced the group culture during eating. The respondents of the same study showed an approach to food preparation, selection, and consumption together with their co-workers. The study revealed that the attitudes and dietary behaviours of co-workers might have influence on the health in both positive and negative ways. Likewise, Ranby et al. (2011) reported that improved dietary co-worker norms with nutritious eating might support group commitment towards health promoting behaviours.

Previous studies, including Bonnell et al. (2017); Obbagy and Essery (2012); Persson and Martensson (2006); and Ranby et al. (2011) reported that the food environment at the workplace might influence the way shift workers eat at the workplace. However, the previous studies did not relate the food environment at the workplace with obesity. In conclusion, this section has discussed the factors at work which might have influence on obesity among shift workers. As different occupations have various working conditions (NIOSH, 2008), the researcher has intended to expand the information regarding the determinant of working conditions which might influence obesity among shift workers focusing on healthcare workers, which is one of the job categories with a high prevalence obesity as stated by several studies, including Coomarasamy et al. (2014); Duodu et al. (2015); Moy et al. (2010); Peplonska et al. (2015); and Zhao et al. (2011). After this, there is a brief discussion on the strategies to control obesity.

2.11 Strategies to Control Obesity

A review by Peirson et al. (2014) reported the effectiveness of behavioural and pharmacologic treatments for overweight and obesity among adults. The study showed that for the behavioural intervention, participation in diet alone (8 studies), diet and exercise (10 studies), and lifestyle interventions (17 studies) led to a greater reduction in weight among the intervention group as compared to the control group. The study added that the intervention by exercise alone did not lead to a significantly greater reduction in weight while the intervention with diet alone showed the largest difference on weight reduction between the intervention group and the control group.

In a recent study, Hussain et al. (2018) found several combined strategies to be effective on weight reduction. The combined strategies conducted included a motivational workshop, one-to-one counselling on a healthy diet, supervised exercise training, and behavioural self-monitoring. However, the effectiveness of each of the strategies was not described in the study. Another study that reported about motivation and obesity was by Chan and Woo (2010) who recommended future research on the motivation for behavioural change to prevent obesity as the study mentioned that obesity prevention and reduction depend on individual lifestyle changes. The authors added that the policies in key settings, such as at the workplace, could be targeted to directly influence the eating and physical activity behaviours. Several behavioural interventions, such as diet alone, diet and exercise, and lifestyle interventions resulted in reduction in weight as reported by Peirson et al. (2014) while several combined strategies resulted in weight reduction as stated by Hussain et al. (2018). This study helps to explore the recommended strategies by the participants of the study to control and prevent obesity among the healthcare workers. The following subsection further discusses on the conceptual framework which showed the available information on possible factors influencing obesity.

2.12 The Conceptual Framework

The conceptual framework of the possible factors influencing obesity is developed based on the previous studies. There are many other components and variables that could be the possible factors influencing obesity and this study focused on dietary behaviour, job stressors, and working conditions which need to study further. Figure 2.2 showed the

conceptual framework on the possible factors influencing obesity based on the previous studies. The next section describes the underlying theory which was helpful as a guide for this study.

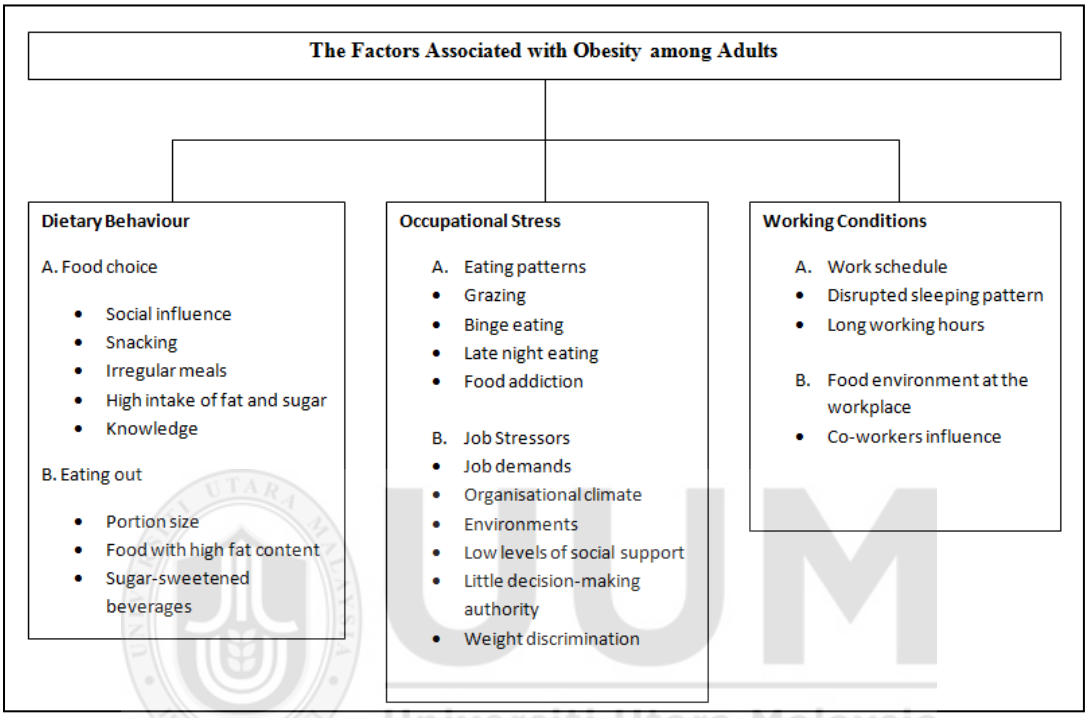


Figure 2.2
Conceptual Framework
Source: Developed for this research

2.13 The Underlying Theory

There are two theoretical frameworks which can be referred to as a guide in this study, they are the Social Ecological Model and Health Belief Model.

2.13.1 Social Ecological Model

This section explains the theory and models which are related to this study. McLaren (2005) defined the ecological model as a conceptual framework that was designed to determine the determinants of behaviour, including both individual and environmental. Over time, numerous disciplines have applied the ecological model as it is beneficial for the researchers and practitioners to understand how humans are impacted on and interact with their environmental context (Player, 2015). A similar definition was stated by Sallis et al. (2008) as they defined the social ecological model as a model which helps to determine the factors affecting behaviour. It also helps as a guide for developing programmes that may improve health through social environments. The social ecological model emphasises the multiple level factors that have influence on behaviour, and the ideas that the social environment influences the behaviour.

A developmental psychologist, Urie Bronfenbrenner, made an important contribution on the introduction of the ecological system approach in the late 1970s. Bronfenbrenner (1994) justified that "the environment is largely defined by social and cultural practices and institutions that provide most of the experiences that people have" (p. 1643). Bonfenbrenner's framework focuses on the subsystems of the human ecological niche, including the ways that these subsystems influence and interact with one another.

"Ecological models encompass an evolving body of theory and research concerned with the processes and conditions that govern the lifelong course of human development in the actual environments in which human beings live" (Bronfenbrenner, 1994, p. 1643). The social ecological model of human development is constructed as a set of nested structures

with each component inside one another like a set of Russian dolls (Bronfenbrenner's native country) as shown in Figure 2.3. These structures are defined according to the description after this, moving from the innermost to the outer level (Bronfenbrenner, 1977, 1994).

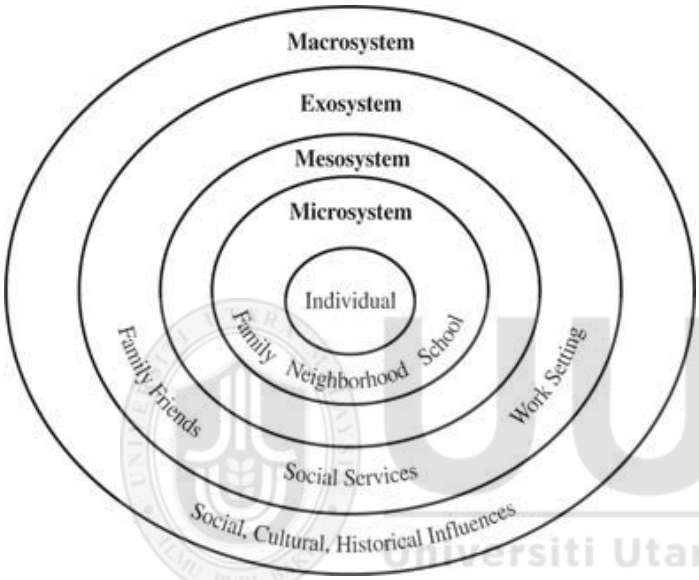


Figure 2.3
Social Ecological Theory
Source: Spencer (2006)

1. Microsystems

   A microsystem is a complex interaction between the developing person and the environment in an immediate setting containing that person. The examples of microsystems include such settings as family and workplace. A setting is a place with specific physical features in which people engage in particular activities or roles for a particular time period, such as employer and employees.

2. Mesosystems

   The mesosystem involves the processes and linkages that take place between two or more settings which contain the developing person. For example, for a worker, the relation between home and the workplace. It is the interaction of different microsystems.

3. Exosystems

   The exosystem comprises the processes and linkages that take place between two or more settings in which one may not contain the developing person, however, the events occur indirectly, influencing the processes within the immediate setting of the developing person's life. For example, for a worker, the relation between the workplace and the children's school.

4. Macrosystems

   The macrosystem involves the overall pattern of micro-, meso-, and ecosystems' characteristics of a given culture or subculture. It is the largest and most distant collection of people and places that may influence the developing person.

5. Chronosystems

   A chronosystem involves the alteration or consistency that happens toward the characteristics or environment in which the developing person lives. Examples are the changes over the life course in family structure, employment, economic status, and place of residence.

There has been a growing interest and application of ecological models in research and practice because the model provides comprehensive approaches for the whole population in terms of changing behaviours, helps to reduce prevalent and serious health problems (Sallis et al., 2008). The main concept of the ecological model is that multiple levels of factors might influence the behaviour including intrapersonal (biological, psychological), interpersonal (social, cultural), organisational, community, physical environment, and policy as shown in Figure 2.4.

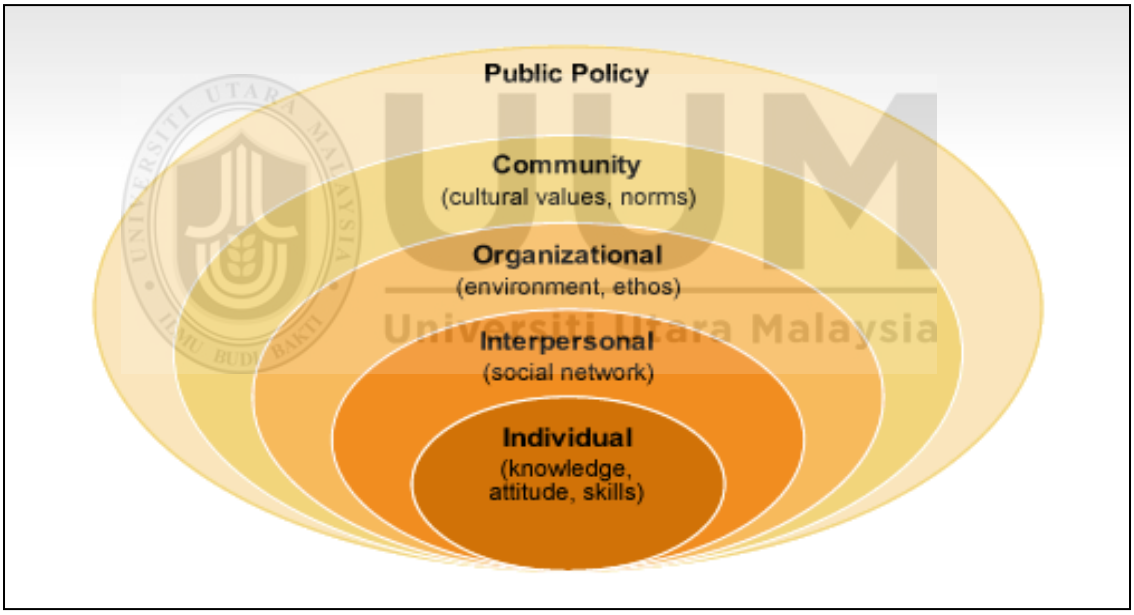


Figure 2.4
Social Ecological Model (Adapted from Bronfenbrenner, 1977)
Source: Glanz (2013)

Ecological models are believed to be beneficial in providing comprehensive frameworks that help to explain multiple and interacting determinants of health behaviours (Sallis et al., 2008). Besides that, this model is also helpful for the development of intervention

approaches that particularly focus on the alteration of mechanisms at each level of influence in a systematic way. Sallis et al. (2008) proposed four principles of ecological perspectives for the change in health behaviours.

1. Multiple levels of factors influence health behaviours.

   The ecological model specifies that health behaviours can be influenced by multiple levels of factors, including intrapersonal, interpersonal, organisational, community, and public policy. The involvement of multiple levels of influence distinguishes the ecological model from other theories which focus on one or two levels.

2. Interaction of influences across levels.

   The interaction of influences means that variables work together. For example, individuals with high motivations to prevent weight gain might have different reactions than individuals with lower motivations to driving past a strip of fast food restaurants. There is a challenge in the research to expand the understanding of the interaction across the levels as ecological models specify multiple levels of influence and it is likely that each level has multiple variables.

3. Multi-level interventions should be most effective in changing behaviour.

   Ecological models specify that single-level intervention is unlikely to have powerful effects. For example, many interventions targeting the individual level showed short-term effects. Similarly, environmental changes alone might be insufficient for behavioural change. For example, putting more fruits and

vegetables in all convenience stores may have only a small impact unless the environmental change is supported together with education, communication, and motivational campaigns.

4. Ecological models are most powerful when they are behaviour-specific.

   An ecological model becomes more beneficial when it is linked to a specific health behaviour that helps in guiding the research and intervention. Usually, environmental and policy variables are behaviour-specific. Some lessons learned in one can be applied to others while some of them cannot be applied to others. For example, promoting jogging cannot be translated to other similar behaviours such as promoting walking to work.

The writing, research, and successful educational programme developments by Urie Bronfenbrenner from the 1950s-1980s grounded the validity and reliability of the social ecological model (Player, 2015). The principles of the social ecological model have been applied and expanded to various fields of human and social behaviour (Richard, Gauvin, & Raine, 2011). Numerous frameworks which built upon the basic ecological model of the obesity epidemic were developed by public health researchers and policy makers (Player, 2015). These frameworks have helped to display and explain causal relationships and direct action to address the obesity epidemic. These models have expanded the basic social ecological model into a framework that is multilevel system-oriented (Player, 2015).

A model by Kumanyika, Jeffery, Morabia, Ritenbaugh, and Antipatis (2002) which built upon the basic ecological model as stated by Player (2015) was also useful for this study.

The model shows the level of determinants and sectors of society that are implicated in the complex systems of obesity as shown in Figure 2.5. The figure illustrates the factors influencing obesity that range from the individual level to the international level. Some of the factors shown might be linked to this study including individual factors (such as food intake) and work factors (such as worksite food and activity).

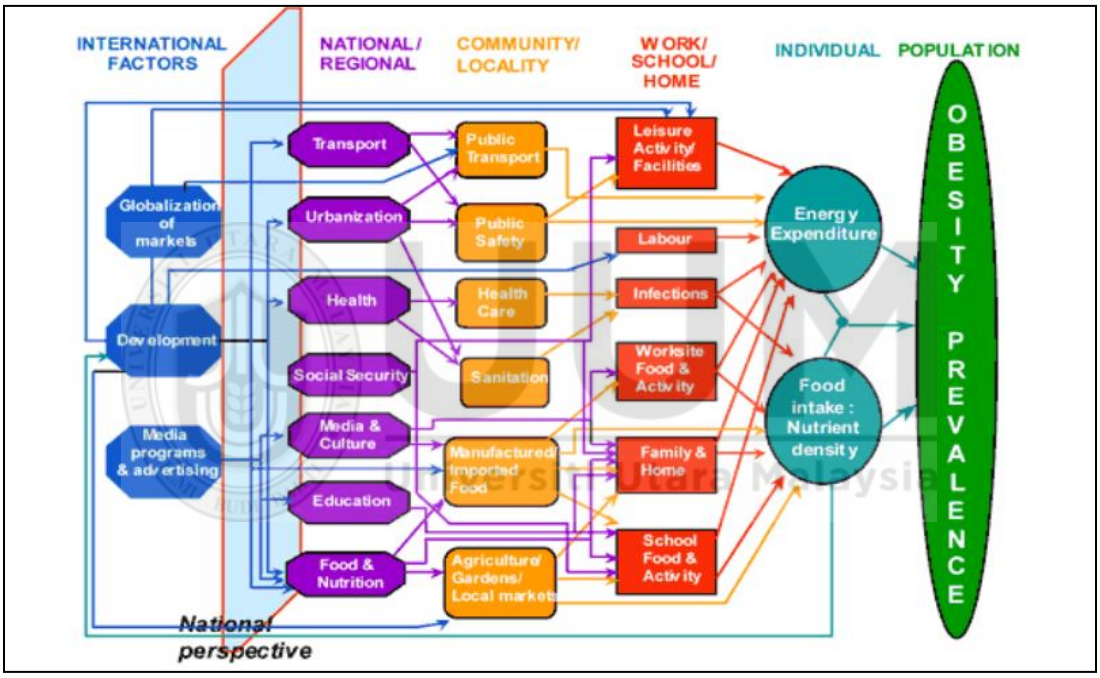


Figure 2.5
Level of Determinants and Sectors of Society are Implicated in the Complex Systems of Obesity
Source: Kumanyika et al. (2002)

Kumanyika et al. (2002) emphasised that the world population is consuming diets high in energy and fat. Due to urbanisation and high incomes, diets have shifted towards high complex carbohydrates and fibre, and various diets have higher consumptions of fats and

sugar. A larger availability of vegetable oils and fats with cheaper prices in the global economy has resulted in higher fat consumption, including among low-income countries (Kumanyika et al., 2002). The researchers added that the lifestyles have shifted to being more sedentary. This has happened due to the shifting pattern towards less physically demanding work, which can be found in many countries both in terms of the proportion of people working in industry, agriculture, and services, as well as the type of work from various occupations. Broad factors regarding the factors which might influence the prevalence of obesity, including food intake and worksite food/ activity are included in the model by Kumanyika et al. (2002). Numerous interactions between the factors might challenge the individual's preference on food choice and energy expenditure.

As the above discussions show, the Social Ecological Theory is generally appropriate for explaining the determinants influencing obesity as it helps to determine the factors affecting behaviour (Sallis et al., 2008). The main concept of the ecological model is that multiple levels of factors might influence the behaviour. The literature review chapter showed different levels of factors that can be the factors influencing obesity, including individual level (dietary behaviour – food choice and emotional eating), interpersonal level (family's and co-workers' influence on food choice), and organisational level (job stressors, working conditions – work schedule and food environment at the workplace). Therefore, the ecological model is suitable in explaining the factors influencing obesity as Sallis et al. (2008) stated that this model helps to explain multiple and interacting determinants of health behaviours.

2.13.2 Health Belief Model

The Health Belief Model (HBM) has been identified as one of the earliest and most influential models in health promotion (Onoruoiza, Musa, Umar, & Kunle, 2015). The model addresses an individual's perception of the threat of a health problem and the accompanying appraisal of a recommended behaviour for preventing or managing the problem (Onoruoiza et al., 2015). This study refers to HBM to identify the strategies to control obesity among healthcare workers by asking the respondents about their perception on the challenges to follow healthy lifestyle which referred to perceived barriers in HBM. In addition, the respondents' opinion on suitable strategies to control obesity can be referred to cues to action in HBM. The original concept of the HBM focuses on personal beliefs or perceptions about a disease and the available strategies to prevent the disease (Hayden, 2009). The HBM was developed by Godfrey Hochbaum, Irwin Rosenstock, and Stephen Kagels who worked in the U.S. Public Health Services in the 1950s.

The model was developed in response to the failure of a free tuberculosis (TB) health screening programme, which showed that the model helps to understand why people failed to adopt a preventative health measure (Onoruoiza et al., 2015). At that time, the TB screening programme was provided for adults with free TB screening x-rays from mobile units conveniently located in various neighbourhoods. However, only a small number of adults came out for the free services, which then made the programme organiser begin to investigate why more adults did not get involved in the programme. Hochbaum then started to study what motivated the people who had come out for the programme. He found that their perceived risk of disease and perceived benefits of action

were crucial factors in their motivation. The HBM was first presented with only four main constructs including perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Hayden, 2009; Onoruoiza et al., 2015). Each of these perceptions, individually or in combination, can be used to explain health behaviour. After that, other constructs were added to the HBM including cues to action and self-efficacy. The HBM is shown in Figure 2.6 followed by the description of each construct.

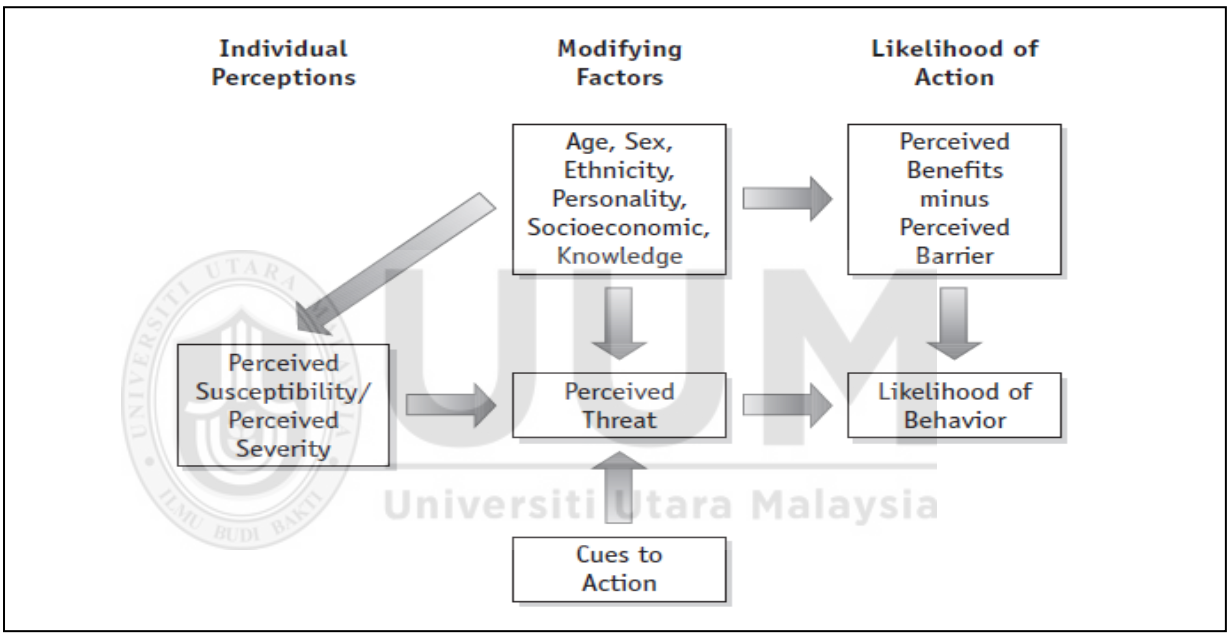


Figure 2.6
Health Belief Model
Source: Hayden (2009)

1. Perceived susceptibility

   Personal risk or susceptibility is one of the perceptions that might influence people to adopt healthier behaviours. It refers to an individual assessment of the risk of developing a health problem. The HBM predicts that individuals who perceive a high risk to a particular health problem tend to engage in behaviours to decrease the risk of developing the health problem as compared to those with a

low perceived susceptibility of developing a disease, who are more likely to engage in unhealthy or risky behaviours.

2. Perceived severity

   This refers to the individual assessment of the severity of a health problem and the consequences that may happen due to the health problem. The HBM proposes that individuals who perceive the severity of a disease tend to engage in behaviours that prevent the development of that disease. Perceived severity not only includes the belief of the seriousness of a disease (may cause a life-threat, pain, or disability), it also includes the impact of the disease on the functioning for work and social roles.

3. Perceived benefit

   Perceived benefit on the value and usefulness of taking action may influence health-related behaviours. It refers to an individual assessment on the value of engaging in health-promoting behaviours to decrease the risk of a disease. A person is likely to engage in a particular action if that person believes it will reduce the susceptibility to a health problem or decrease its seriousness.

4. Perceived barriers

   Perceived barriers refer to an individual's own evaluation of the obstacles in changing the behaviour. Of all the constructs, perceived barriers are the most significant in determining behaviour change. Perceived barriers in taking action

include the perceived inconveniences, expense, danger, and discomfort (such as pain or emotional upset) involved when engaged in the behaviour.

5. Cues to action

   The HBM proposes that a cue or a trigger is needed to initiate the decision-making process for engagement in health-promoting behaviours.

6. Self-efficacy

   This refers to an individual's perception of his or her ability to effectively perform a behaviour which can change the attitude towards the perception of the disease.

In conclusion, the HBM proposes that people will take preventive action for health problems if they believe themselves to be susceptible to a condition (perceived susceptibility), if they believe there would be potential seriousness from the consequences (perceived severity), if they believe certain actions would reduce the severity or susceptibility or lead to other positive outcomes (perceived benefits), and if they perceive that there are few negative attributes related to the health action (perceived barriers) (Jones et al., 2015). Obese individuals with health beliefs opposed to supporting the management of obesity are less likely to achieve long-term weight loss and management (Dedeli & Fadiloglu, 2011). It is important to address the behavioural and psychological factors that prevent obese individuals from permanently changing their behaviours. The HBM can be used as a tool to determine general health-related thoughts concerning the personal prevention strategies of obese individuals (Dedeli & Fadiloglu, 2011). In this study, the HBM has been adapted to focus on the perceived barriers so that

appropriate strategies could be developed to control and prevent obesity. Dedeli and Fadiloglu (2011) also stated that the HBM addresses the effects of beliefs on health and the decision process in making behavioural changes. The authors added that behavioural change models are important in preventing weight gain and decreasing excess weight to help an individual achieve the goal of living a healthier life. By encompassing and understanding the underlying factors that affect and influence an individual's behaviour, the HBM would be useful to propose strategies for weight management which will be beneficial for both employers and employees.

2.14 Chapter Summary

This chapter has provided an understanding of the current state of knowledge on the factors that could potentially influence obesity. This chapter discussed the factors that have been focused on in this study, including the dietary behaviours, job stressors, and working conditions based on the literature of previous studies. In addition, this chapter discussed the theory and models that helped to guide this study. Several dietary behaviours were reported by the previous studies in which some of them only related to shift working with no relation to obesity; while some of the dietary behaviours were related to obesity but they varied according to different occupations. The possible determinants influencing obesity, job stressors and working conditions, also varied according to occupation. This study has intended to explore the factors influencing obesity focusing on dietary behaviour, job stressors, and working conditions among healthcare workers in two public hospitals in Kedah. The next chapter further discusses the methodology of this study.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter contains the research design of this study. It is comprised of further explanation on how the study was conducted in order to achieve its objectives. As it is focused on a qualitative method, semi-structured interviews among healthcare workers were carried out to further assist the research. Chapter 3 also includes the research design, data collection, population of interest, instrumentation, data analysis, and ethical consideration.

3.2 Research Design

According to Sekaran and Bougie (2010), few qualitative studies are exploratory in nature as the data collection is done through interviews or by observation. The authors added that the data gathered from this process would reveal some interest about the phenomenon of interest, additional theory development, and formulation of hypotheses for subsequent testing. Exploratory studies are also beneficial when some facts are known, however there is a need of more information for developing a viable theoretical framework (Sekaran & Bougie, 2010). The nature of both research problem and questions being developed from the aforementioned fundamentals is among many factors that influence researchers in choosing the type of study to be conducted (Creswell, 2012). As this study intends to explore more information regarding the factors influencing obesity

based on human experience and belief, thus qualitative research design was used for adding more theoretical understanding on obesity issue.

The objectives of this study are aligned with the reason of better understanding of the behavioural patterns and the way they influence and interact with health and nutritional status, based on the values in conducting qualitative method specifically for a health and nutrition research by Draper (2004). Qualitative research is deemed as the most suitable study design to be adapted for this particular research, which can be applied to achieve the objectives. As stated by Draper (2004), qualitative research involves the quality or nature of human experiences and seeks to understand the phenomena through an individual's perspective. It can be generally described as interpretive and naturalistic, given that this design pursues justification upon a belief or behaviour, within the context they occur. As per this study, this approach had helped facilitated collection of in-depth information and rich data, in regards to the factors influencing obesity among healthcare workers, based on their beliefs and behaviour.

This is a purposive sampling study and the unit of analysis for this study is individual. Semi-structured interviews were used in this study to obtain in-depth information on the factors influencing obesity among healthcare workers. Semi-structured interview is when the researcher has a list of questions that would cover few topics, normally referred as an interview guide and the questions that are not included are allowed to be asked by the interviewer with the intention to gather related information mentioned by the interviewee (Bryman & Bell, 2011). In this study, the researcher asked questions to the participants regarding dietary behaviour, job stressors, and working conditions according to the interview guide. The interviews were conducted between 15 to 30 minutes to complete

and it was audio-recorded. In qualitative studies, data can be collected through multiple means such as pictures, notes taken by moderator, videotapes, and audiotapes. In this study however, audiotapes were recorded as a mean of data collection during in-depth interviews— a technique conducted through intensive individual interview towards a small number of respondents which is beneficial in exploring the perspectives of respondents on a particular idea, situation, or program (Boyce & Neale, 2006).

3.3 Data Collection Procedures

Creswell (2012) had laid out five interrelated steps during the process of data collection for qualitative research. Firstly, the participants and sites that will be studied should be identified and the sampling strategy determined, giving a better understanding towards the central phenomenon. Next, seek permission to obtain access to the participants and sites. Thirdly, it is important to consider what type of information is required to achieve the objectives of study. The researcher then needs to design instruments that will be used for collecting data. Finally, administer the data collection while considering the ethical issues that may arise.

With that in mind, the researcher came to choose healthcare workers as the participants and hospital as the site of study to achieve the objectives of study. Firstly, the investigator asked permission for obtaining access to participants and sites of study from Medical Research Ethics and Committee (MREC) and from the study sites (Hospital Sultanah Bahiyah and Hospital Sultan Abdul Halim, Kedah). Then, the permission to conduct a research in selected hospitals was sought from National Medical Research Register,

Malaysia. After obtained approval from MREC (see Appendix A) and the director of Hospital Sultanah Bahiyah and Hospital Sultan Abdul Halim (see Appendix B), the investigator proceeded with selection of participants. This study used purposive sampling and the inclusion criteria were healthcare workers with obesity (BMI≥30), Malaysian, and their age must be between 20 to 60 years old. The age below than 20 did not included in inclusion criteria because the BMI-for-age classification for age 5 to 19 is different than adults according to WHO Reference 2007 as it referred to the z-scores (WHO, 2018a). The age above 60 is not included as the retirement age in Malaysia is at 60 years old. The exclusion criteria were those with underweight, normal weight, or overweight healthcare workers, and pregnant women.

As to ensure this study does not disturb the healthcare workers while working, the investigator approached the healthcare workers who already finished their working time at the hospital ground floor or outside of the wards. The investigator approached the potential participants working shift hours at 9.a.m. and 3 p.m. after they finished their duty. Then for healthcare workers working office hours, the investigator approached the potential participants after end of office hours at the cafeteria or at the ground floor of the hospital by approaching healthcare workers wearing working uniform or with name tag who seem of having obesity.

The potential participants were informed about the study. They were requested to contact the investigator if they interested to participate in the study. Appointments were made where the potential participants received information sheet (see Appendix C) about the study along with its explanations. Those who were willing to participate were asked to fill in the consent form (see Appendix D). Then, the researcher set the date, time, and

place that were convenient to conduct each interview with respective respondents. Albeit so, most of them had informed they did not have the luxury to schedule an interview. As a result, interview sessions with eleven of them were conducted through phone calls instead, while the remaining nine participants had face-to-face interview. Prior to that, forms consisted of demographics (see Appendix E) were given to be answered by the participants. The interview guide had included twelve questions integrated with inquiries upon dietary behaviour, job stressors, and working conditions adapted from several sources (Bonnell et al., 2017; Boon, 2014; Strickland et al., 2015) (see Appendix F).

The data collected by audio recording was transcribed and then analysed by using thematic analysis. Data collection and data analysis occurred simultaneously until it reached data saturation (data reached informational redundancy and ability to obtain additional new information has been attained). Then, a model was developed in this study consisting on the factors that focused on dietary behaviour, job stressors, and working conditions which can be the factors influencing obesity among healthcare workers. Figure 3.1 shows the flow diagram of procedure involves in this study.

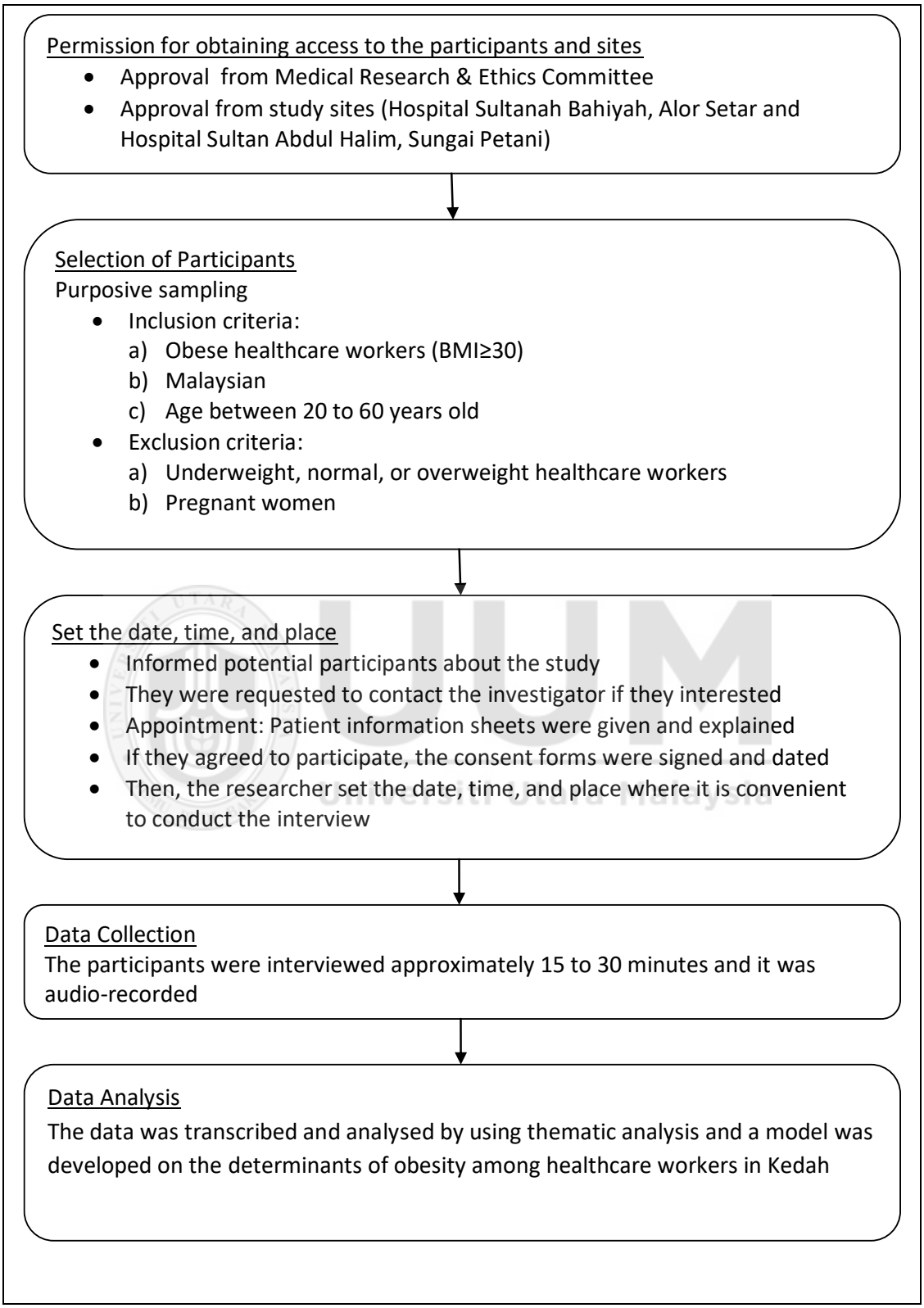


Figure 3.1
Procedures Involved in This Study
Source: Developed for this research

3.4 Population of Interest

This study was conducted in Kedah as it was placed as the top five states with highest obesity in Malaysia and it was placed as the highest prevalence of diabetes and hypertension among adults in Malaysia (Hamid, 2019; Ministry of Health Malaysia, 2015). Obesity can be a major modifiable risk factor for NCDs including diabetes and hypertension (WHO, 2018a). Population of interest for this study is the healthcare workers in Hospital Sultanah Bahiyah and Hospital Sultan Abdul Halim, Kedah. Healthcare workers were chosen given how several previous studies had discovered high prevalence of obesity issues among healthcare workers in Malaysia (Coomarasamy et al., 2014; Hussain et al., 2018; Jabatan Kesihatan Negeri Kedah, 2012; Moy et al., 2010, Taib et al., 2019). It is important to investigate the factors influencing obesity among healthcare workers because they are responsible for healthcare services, public health promotion, and prevention of obesity (Cakmur & Anuk, 2017; Coomarasamy et al., 2017; Taib et al., 2019). As a matter of fact, obesity has also been associated with several other concerns at the workplace, inclusive having to suffer higher incidence of injuries, high medical cost, losing more workdays, and reducing productivity (Borak, 2011; Lin et al., 2013; Robroek et al., 2011).

Samples for qualitative studies would usually be comprised of smaller sizes, though there are three main reasons for this (Ritchie & Lewis, 2003). First, if the data are properly analysed, there will come a point where very little new evidence is obtained from each additional fieldwork unit. Secondly, qualitative research does not concern with statements regarding incidence or prevalence. Thirdly, qualitative studies include rich and detailed information (Ritchie & Lewis, 2003). Sandelowski (1995) affirmed that adequate number

of samples is necessary to support particular qualitative enterprises. It should not be too large as it involves deep and case-oriented analysis, likewise it should not be too small in order to obtain new and richly textured understanding of the experience (Sandelowski, 1995). The concept of data saturation is when there is enough information collected to replicate the study, the ability to obtain additional new information has been attained, and also when further coding is no longer feasible (Fusch & Ness, 2015).

There are nine hospitals in Negeri Kedah including Hospital Sultanah Bahiyah, Hospital Sultan Abdul Halim, Hospital Jitra, Hospital Langkawi, Hospital Yan, Hospital Baling, Hospital Sik, Hospital Kulim, and Hospital Kuala Nerang. Two hospitals with the highest number of healthcare workers were selected for higher number of potential participants. Total number of healthcare workers in Negeri Kedah were 9729. Two hospitals involved in this study were Hospital Sultanah Bahiyah, Alor Setar and Hospital Sultan Abdul Halim, Sungai Petani. Total number of healthcare workers in Hospital Sultanah Bahiyah in 2019 was 3747 while in Hospital Sultan Abdul Halim was 2372. The data of human resource in health sector of Kedah had categorised the health profession into Medical Officer, Dental Officer, Pharmacist, Nurses, Medical Assistant, and Environmental Health Assistant Officer. As the study by Hussain et al. (2018) found that nurses and medical assistants are the healthcare workers with higher rate of obesity, this study only focused on nurses and medical assistants.

The researcher had approached the potential participants who were available at the hospital after shift working time end by homogeneous purposive sampling according to the inclusion criteria. The purposive sampling technique or also called as judgment sampling is the deliberate choice of participants based on the qualities the participants

possess (Etikan, Musa, & Alkassim, 2016). Homogeneous purposive sample is one that is selected of having shared characteristics or set of characteristics (Crossman, 2019) and in this study the participants must have BMI more than 30 (obese). In both hospitals, the researcher approached the potential respondents who seem of having obesity at the hospital lobby, in front of the wards, and also at the cafeteria. The selection of participants was based on the judgment of the researcher by approaching healthcare workers who seem of having the inclusion criteria. Selection of the sample can be done by the researcher by using a sound judgement (Etikan et al., 2016). The researcher decides of particular information needed and sets out to find people who are available and willing to provide the information by virtue of knowledge or experience (Etikan et al., 2016).

In this study, the data was collected and analysed simultaneously, until it reached data saturation. There were 24 interviews conducted, however the data reached saturation for respondent number 20. After that, there was no new information emerged and there was repetition of themes and sub-themes. Although the data reached saturation at 20, then the interviews were conducted until 24 to ensure no new theme emerge as proposed by Latham (n.d.) that to ensure the data has reached saturation, a researcher has to go beyond the point of saturation to ensure that no new theme emerge in the next few interviews or observations. Total number of respondents in this study was 20 healthcare workers which are more than the number of participants proposed by Guest, Bunce, and Johnson (2006) that saturation often occurs around 12 participants in homogeneous group. The process for sample selection of this study is shown in Figure 3.2.

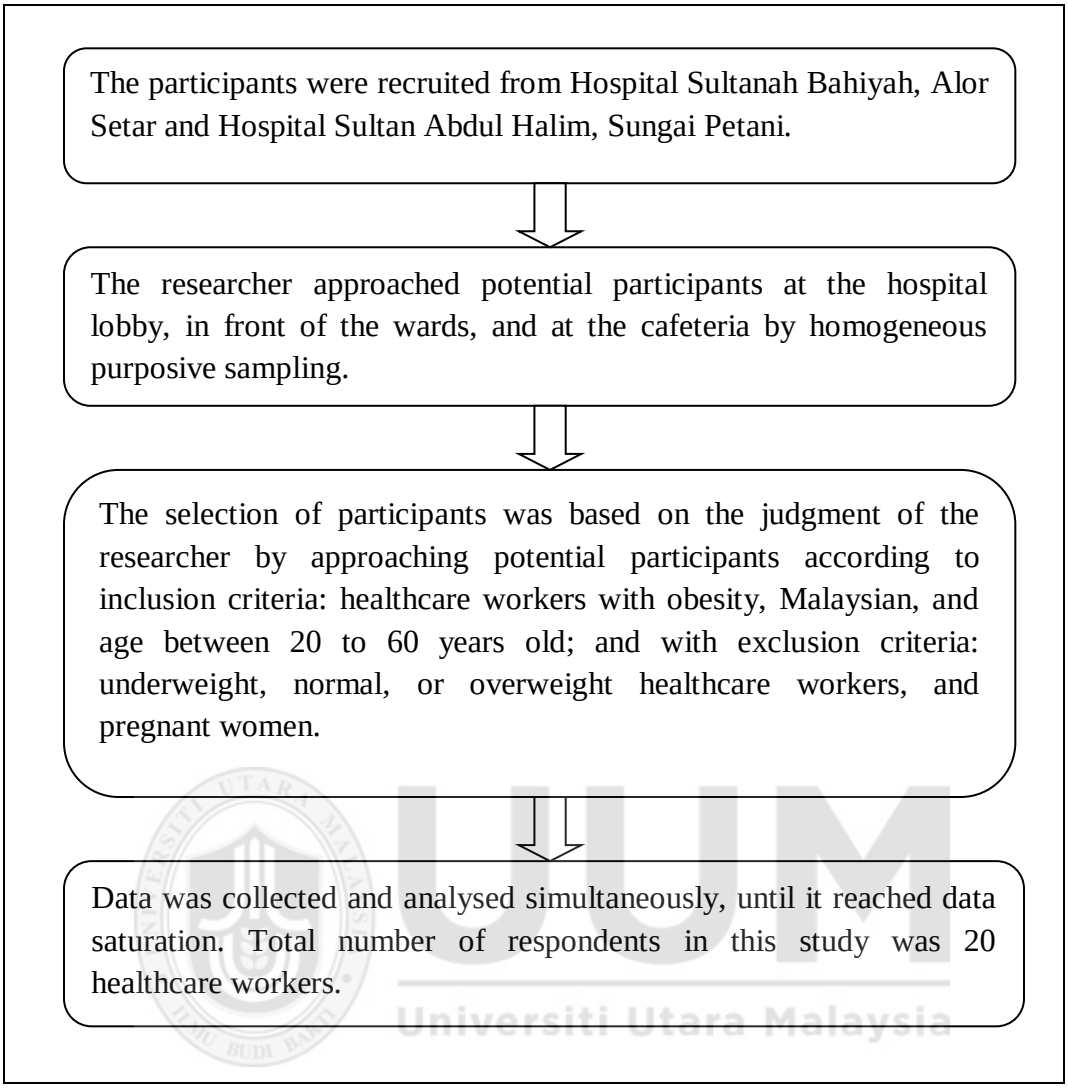


Figure 3.2
Sample Selection
Source: Developed for this research

3.5 Instrumentation

One of the inclusion criteria of this study is the participants must be obese. Thus, in order to know respective weight status to calculate their BMIs, the weight and height of each participant were self-reported by having them writing down under the demographic section of the form. As for the interview, every session was conducted in *Bahasa Melayu* as it is the national language in Malaysia. Given that the participants are Malaysians and

Bahasa Melayu is the spoken language in Malaysia, it is expected that *Bahasa Melayu* is the most suitable language to conduct the interviews in. It also allows the respondents better understanding of the questions, consequently giving better explanation to their answers.

The original source of interview guide from Boon (2014) is available in *Bahasa Melayu*. The questions in the interview guide regarding meal frequency and eating behaviour were adapted from Boon (2014) while the questions on the source of food and food choice were modified from Bonnell et al. (2017). The remaining questions about daily routines at the workplace and the challenges of healthy lifestyle were modified from Strickland et al. (2015). However, several questions from Bonnell et al. (2017) and Strickland et al. (2015) had to be translated into *Bahasa Melayu* for the reason that original questionnaires are in English. According to Brislin (1970), several techniques can be used to translate a questionnaire including back translation, bilingual technique, committee approach, and pre-test procedure. In this research, back translation was applied in translating the questionnaire.

Back translation is a procedure in which two bilinguals would interpret a document (Brislin, 1970). The first bilingual is an English teacher with a master's degree in Teaching English as a Second Language (TESL) and she translated the original source of English questions to Malay. While the second bilingual is a subtitle editor who also with a master's degree in TESL and she reverse translated from Malay to English. Then, the researcher would have to compare the two versions of original language. If they are not identical, then the discrepancies should be discussed to clear up errors by the two bilinguals. This is called decentering, which refers to a translation process that is used to

ensure identical items in both foreign and back-translated versions by revising based on an original English source (Brislin, 1970).

3.6 Data Analysis

Wong (2008) defined data analysis in qualitative research as a systematic process of searching and arranging the information, which helps to explain about certain phenomenon, gathered through several ways inclusive interview transcripts, observation notes, or non-textual materials. The data are finalised in the form of words (Sekaran & Bougie, 2010). Qualitative data can be obtained from variety of sources, either primary or secondary such as individuals, focus groups, company records, internet, and government publications (Sekaran & Bougie, 2010). In this study, the data was obtained from a primary source: individual interviews.

There are five approaches in a qualitative study which are narrative research, grounded theory, ethnographies, case studies, and phenomenology (Lewis, 2015). In this study, phenomenology approach is used as to obtain information regarding the belief and behaviour of healthcare workers with obesity, to explore the factors influencing obesity among them. Next subsection further discusses on the technique that was used during data analysis.

3.6.1 Thematic Analysis

The data in this study was analysed by using thematic analysis, referring to the steps described by Clarke and Braun (2013) as shown in Figure 3.3. Thematic analysis is a method used to define, analyse and report patterns (themes) within data, and helps to describe the research topic from various aspects (Braun & Clarke, 2006).

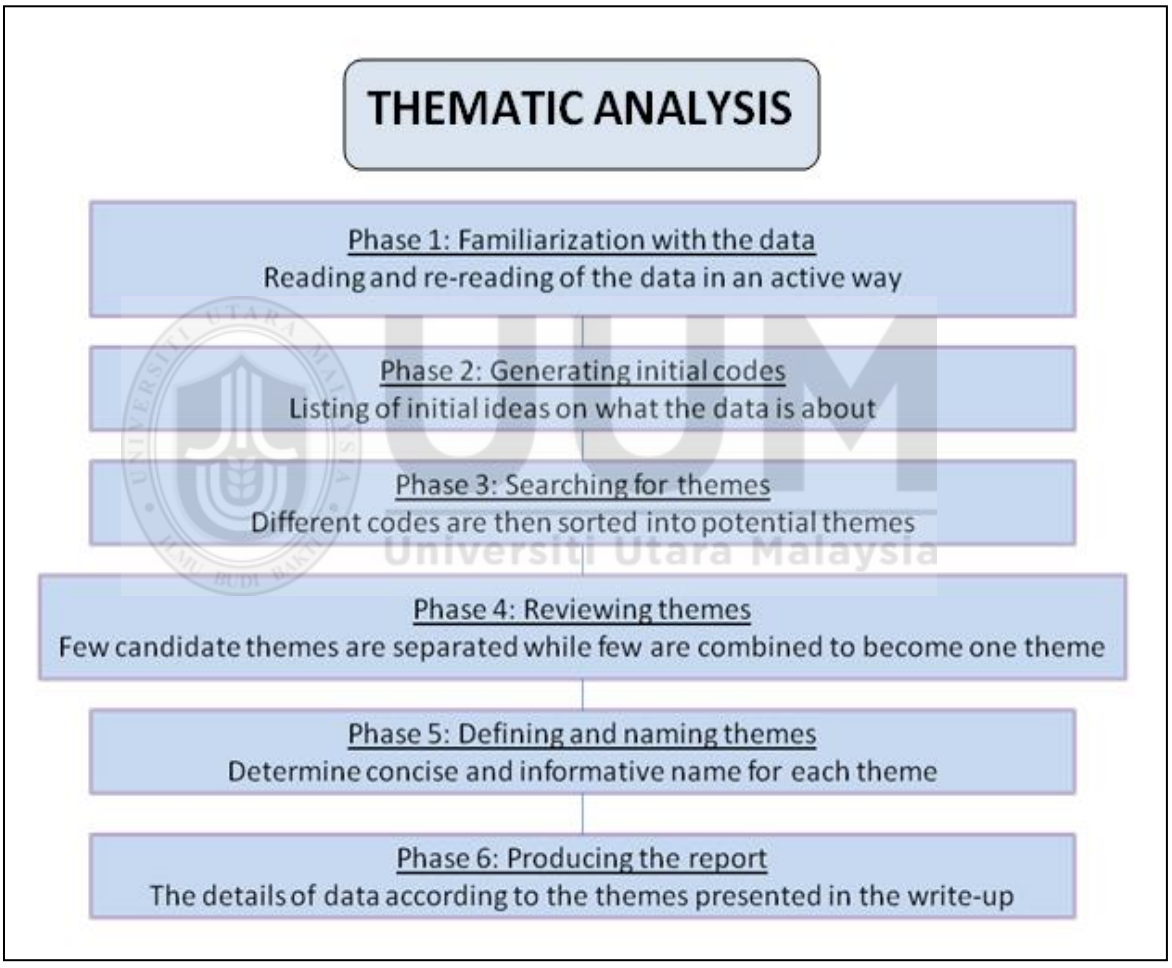


Figure 3.3
Thematic Analysis
Source: Clarke and Braun (2013)

The entire process should not be viewed as a linear model in which one cannot continue with the next process without completing the prior phase, as the analysis is rather a recursive process. There are six phases of thematic analysis used to analyse the data in this study as explained by Braun and Clarke (2006) and Clarke and Braun (2013) which are described as followed:

Phase 1: Familiarization with the data

The researcher becomes familiar with the content through immersion with the data and this process is done by reading and re-reading of the data in an active way, inclusive searching for meanings and patterns that would help to note any initial analytic observations. The researcher would have to read through the entire data set three times before proceeding with coding process. As the data collected in this study was in verbal form, the data was transcribed into written form in order to conduct thematic analysis.

Phase 2: Generating initial codes

Phase 2 begins when the researcher has read and become familiarized with the data, along with listing of initial ideas on what the data is about. The initial codes from the data are produced in this process. Coding is a process in which the researcher codes every item in the data and the process would continue by collating all the codes and relevant data extracts. As this process was done manually, the researcher used highlighters and coloured pens to indicate potential patterns. Then the researcher would have to check through the data to ensure that all data extracts are coded, and then collated together within each code.

Phase 3: Searching for themes

After all the data have been initially coded and collated in the previous phase, the researcher would have been able to identify different codes across the data set formed in a long list. In this phase, the researcher has to focus on the analysis of broader level of themes, as compared to previous phase that is focused on the codes. Different codes are then sorted into potential themes and collated based on their relevancy.

Phase 4: Reviewing themes

A collection of candidate themes and sub-themes are identified through previous phase. In this phase, the themes would be reviewed in a way that if not enough data can support the candidate theme, then it could not be referred as a theme. Few candidate themes are broken down to form separate themes, while few are combined to become one theme.

Phase 5: Defining and naming themes

In this phase, the themes identified in the data analysis are defined and further refined by the researcher. It is the process of identifying the essence of each theme and determines the aspects of the data with concise and informative name for each captured themes.

Phase 6: Producing the report

Then, the details of data within and across themes in a logical and non-repetitive way would be presented in the write-up. Evidences would be likewise provided, according to the themes set within the data, contextualised based on existing literatures.

3.6.2 Trustworthiness

Lincoln and Guba (1985) proposed that it is necessary to identify ways and specific terms to establish and assess the quality of qualitative research as a way to provide an alternative to reliability and validity. They also proposed trustworthiness as the primary criteria in assessing qualitative studies. Lincoln and Guba (1985) laid out four benchmarks in determining trustworthiness: credibility, transferability, dependability, and confirmability.

Credibility of qualitative research can be improved through several techniques as suggested by Lincoln and Guba (1985) including prolonged engagement in the field, triangulation, checking interpretations against raw data, negative case analysis, persistent observation, peer debriefing, and member checking. For this particular study, the researcher had adapted triangulation to ensure that the data obtained from the participants would represent actual situation of their daily routine. The data was collected through interviews, 24-hour diet recall, and observation. Different methods used helps to ensure that the data represent the actual daily routines and belief of the respondents. The recorded audio of the interview based on the interview guide, 24-hour diet recall was reported by filling in the tables, and observation at the hospitals on their daily routines at work were beneficial for the credibility of this research.

Transferability was also applied upon analysis as Lincoln and Guba (1985) stated that a thick description would only provide others with what they refer to as a database a platform in making judgements about the possible transferability of findings to different settings or contexts. In fact, said thick description can only be attained through detailed

narratives from transcribed interviews. In this study, the entire transcribed interview consists of thick description were available in both softcopy and hardcopy. All the steps involved in this study also were reported. Thus, it would be useful for possible transferability to different settings.

The next criterion of trustworthiness in qualitative research is dependability. Dependability can be pertained by ensuring that the study has complete records of all phases of the research process (Bryman & Bell, 2011). Last but not least, the final criterion is confirmability. The internal coherence of the research product can be used to determine the confirmability in qualitative research by checking the data, interpretations, findings, and recommendations. This study had materials that could be used for these audits including coding manuals, theoretical notes and memos, recorded data, and interview transcripts.

3.7 Ethical Consideration

Ethical issues are important in a qualitative study as this particular method intrudes social lives of other human beings and the researchers must ensure the rights, privacy, and welfare of selected participants (Berg, 2001). It is especially important to take note during the completion of this study, given that it touches upon obesity, a sensitive issue to few (Sand, Emaus, & Lian, 2015). Therefore, it is important to establish certain ethical standards in order to protect their privacy.

The researcher had informed both verbally and in writing (which was included in the information sheet and consent form) regarding the objectives of this study and gave

emphasis on high confidentially pertaining data gathered from in-depth interviews. The privacy and confidentiality of participants' personal information were protected and their responses were held in the strictest of confidence. Their names and any other identifying information were neither collected nor included in the responses. Participants' confidentiality was maintained by assigning specific codes to each participant, ensuring anonymity and confidentiality of the provided information.

For data collection, the interview sessions were audio recorded and only the researcher had the access. All confidential electronic data was protected using passwords. The recorded data is treated with high confidentiality for nine months, and then destroyed after said period. All paper copies of data and reports are stored in a secured archive. Even though information gained in this study may be published in a journal article, their names or any other personal information will not be identified. Information concerning participants of study will remain strictly confidential. All means of data collection including questionnaires, consent forms, interview transcripts, and audio recording are also treated with high confidentiality and anonymity in order to maintain ethical conduct in this study.

3.8 Chapter Summary

This chapter discusses the details on the methodologies and procedures used throughout the process of conducting this research. Qualitative method was used to collect the data by conducting semi-structured in depth interview to twenty (20) healthcare workers from two hospitals in Kedah which are Hospital Sultanah Bahiyah, Alor Setar and Hospital

Sultan Abdul Halim, Sungai Petani. In depth interview was adopted because of the need to generate deep insights into the participants' belief and experience regarding obesity. There were two phases in selection of participants of this study including through purposive sampling and convenience sampling. The interviews were audio recorded and then the data was transcribed. After that, the data was analysed manually by using thematic analysis.

CHAPTER 4

FINDINGS

4.1 Introduction

This chapter presents the findings of collected data. The participants were able to communicate and reflect on their experiences and beliefs regarding the possible factors that influence obesity among healthcare workers. Results of the analysis generated from the data have provided answers to the research questions formulated for this study. The main issue to this research is concerning the high prevalence of obesity among healthcare workers, which might affect both workers and employers. The data is analysed through two phases: the first phase involves analysing the factors influencing obesity among healthcare workers, while the second phase is focused on examining strategies as suggested by healthcare workers, which can be done in helping weight management issues among workers. This chapter interprets the richness of data that would help in achieving the objectives of this study. For next section, brief profiles of all informants who had participated in the study are laid out accordingly, along with the key findings that are based on the research issues.

4.2 Profile of Respondents

The total number of the informants was twenty (20). In terms of gender, twelve (12) were female, while the remaining eight (8) were male. Of the twenty (20) informants, eight (8) informants were classified under obesity Class I (BMI 30-34.9), nine (9) informants with obesity Class II (BMI 35-39.9), and three (3) informants with obesity class III (BMI>40). As for occupational faction, twelve (12) informants were nurses and eight (8) informants

were medical assistants. A brief profile of the twenty (20) informants is shown in Table 4.1.

Table 4.1
Background Information of the Informants

No.	Respondents	Age	Gender	BMI (kg/m^2)	Occupation	Health problem
1.	Informant 1	42	Female	30.22	Nurse	No
2.	Informant 2	30	Female	30.30	Nurse	No
3.	Informant 3	32	Female	34.85	Nurse	No
4.	Informant 4	47	Female	34.36	Nurse	Asthma and Osteoarthritis
5.	Informant 5	49	Male	30.49	Medical Assistant	Hypertension
6.	Informant 6	42	Female	33.27	Nurse	No
7.	Informant 7	44	Male	35.51	Medical Assistant	Hypertension
8.	Informant 8	33	Female	51.26	Nurse	No
9.	Informant 9	29	Female	36.31	Nurse	No
10.	Informant 10	30	Female	35.88	Nurse	No
11.	Informant 11	42	Female	41.66	Nurse	Osteoarthritis
12.	Informant 12	41	Female	31.64	Nurse	Hypertension
13.	Informant 13	36	Male	39.18	Medical Assistant	No
14.	Informant 14	38	Male	36.33	Medical Assistant	Hypertension
15.	Informant 15	52	Male	35.49	Medical Assistant	Hypertension
16.	Informant 16	29	Female	35.38	Nurse	No
17.	Informant 17	30	Female	42.22	Nurse	No
18.	Informant 18	38	Male	30.12	Medical Assistant	Diabetes Mellitus
19.	Informant 19	30	Male	36.33	Medical Assistant	No
20.	Informant 20	52	Male	38.17	Medical Assistant	Asthma and Meningioma

Source: Developed for this research

Almost half of the participants, being nine (9) out of twenty (20) informants were testified to suffer with several health problems. Five (5) out of twenty (20) reported of having hypertension. Besides that, two (2) of them have osteoarthritis, with one of them who also suffers from asthma. Another informant did inform that he has both asthma and meningioma. Only one participant was diagnosed with diabetes mellitus, in which led him to having partial foot amputation.

4.3 Results

The data analysed from the transcribed interview was arranged according to themes. There were main themes, sub-themes, and sub-sub-themes that emerged through manual thematic analysis. Interpretive approach was used to commence the analysis of data that had emerged from the themes. The findings are discussed and presented under several main themes: dietary behaviour, job stressors, and working conditions.

4.3.1 Dietary Behaviour

This main theme is comprised of three sub-themes which emerged from the informants' experience concerning their dietary behaviour that might be the factors influencing obesity among them. The sub-themes are food choice, eating patterns, and dining out.

4.3.1.1 Food Choice

The first factor that was found to have influenced dietary behaviour among healthcare workers is one's food choice. Analysis upon the interview transcripts further revealed several other factors that fall under this sub category including time pressure, convenience, social influence, appetite, limited food available, habit, sugary drinks, and water intake.

Time pressure

Few participants reported to experience difficulties when it comes to having appropriate meals at their workplace. There were eleven (11) of those who mentioned the factor of time, which influences their dietary pick of the day, supported by these explanations listed below on the case of time pressure.

> At the workplace, I would try to find food which can be eaten immediately, because of time. I would choose food that can be ordered faster and served faster. (Informant 1).
>
> Urm, our duty at the workplace is always busy and we also have to eat while rushing. Sometimes we don't even have time to eat. (Informant 2).
>
> Because sometimes when it's too busy, when the ward is full, then we don't even have time to eat. Not only we don't have time to eat, even if we want to drink water, we don't have time for that. (Informant 4).
>
> Sometimes, if I have the time, I would eat, if it's too busy then I don't get a chance to eat. Just eat anything that is available. If there is some free time available, then we would eat, but at times, we take turns among co-workers to eat. (Informant 11).
>
> It takes about 15 minutes because I need to rush, in case there are other work that need to be done. It's always a rush whenever I'm eating at the workplace, but if at home, it would be more relaxed. (Informant 12).
>
> Something that is convenient and fast because we are rushing with the tasks at the workplace. It depends, sometimes when it gets too busy that we don't even have time to eat. At times if we are not too busy then we could enjoy the food. (Informant 13).
>
> I think, the problem has always been about time. We have to start working early, but we cannot go back early. Sometimes we don't even have the time to eat. (Informant 16).
>
> We don't have break time. We just eat whenever we have some free time, after we have finished eating, we then would continue with our work. (Informant 17).

Few described that they do not have specific time to eat, inevitably tampering their eating schedule or worse, causing them to skip meals. Due to such irregularity, participants had admitted that they are unable to have main meals at appropriate time with constant intervals. In fact, they at times would have to combine two meals together, given how pressed they are when it comes to time.

> Sometimes it's too busy. Sometimes, as I'm still feeling full because I already had breakfast, I would skip lunch and when I start working in the evening, only then I

would eat. Sometimes, when it's too busy, I would eat a bit late around 6 to 7 p.m. and it's considered as dinner. If I have the time, I would eat. If not, when I get home at night, I would find something to eat instead. That's the case if I'm busy. If not, I would eat in the evening, then at night I would not eat anymore. (Informant 8).

It's not fixed given that at times, I don't have the time to eat, given how there is no specific time for us to take a break. So, when I do have the time, I would go eat. So around 10 a.m. if I have the time, I would go and eat. Sometimes it's around 10 a.m., 11 a.m., or 12 p.m. but at times I don't even get to eat lunch. So, when I do get home, I would have lunch. (Informant 9).

If I eat at 10 a.m., it's inclusive with lunch given that at times I would be busy with my work, therefore I don't have time to eat. Sometimes, when we are too busy, we don't even have time to eat. (Informant 10).

Convenience

A number of informants expressed that they would choose the food which is convenient for them. There were seven (7) informants who prefer to eat something that is easier to get, depending on what is available near them. Here are the quotations from informants regarding their choice when it comes to choosing food that is convenient for them.

During busy day, I just eat anything that is available. (Informant 1).

Urm, I'm looking for something easier to get. It is definitely easier if I were to buy the food from the cafeteria, however I don't order fried food as it takes longer time. So, I just eat rice with side dishes, which are readily available. (Informant 2).

... we look for something easier, something we can get faster. (Informant 6).

Sometimes if I have the time, I would eat. If it's too busy then I don't get a chance to eat. Just eat anything that is available. (Informant 11).

So at times, for the food choice, we just take up whatever near to us because for us, it's hard for us to go downstairs to buy food. Therefore, we would occasionally just eat anything that is available in front of us. (Informant 12).

> It's easier because sometimes during working hours, we just buy takeaway food and then we can eat immediately. (Informant 13).
>
> Urm, I always eat rice, sometimes I would order *nasi goreng* or *mee goreng* or something like that which are easy to get. (Informant 17).

Social Influence

Few number of participants reported that social factor has influenced their food choice. Three (3) informants stated it can be influenced by their family members and friends, as shown from the following quotations by informants 3, 8, and 12. Informant 3 had described that she tried to go on a diet, however it can be hard to be managed especially when under stress and without her friend's support.

> I have tried to diet before to control my body weight, but then when I became happy, I would stop doing all that. When we are under the state of stress, then it's hard to control things like that. And also friends... if my friends are not... I don't know how to say. As for me, if my friends will not support me, then I will not have motivation. I would feel down. (Informant 3).

While for informant 8, she stated that her selection of drinks does depend on what her husband wants. As for informant 12 she explained that she rarely takes breakfast given that she does not cook for breakfast for her husband does not enjoy it.

> For drinks, it depends on what my husband wants. Sometimes, he wants coffee or Nescafe. (Informant 8).
>
> I don't focus on breakfast, sometimes I don't take breakfast... I don't cook for breakfast because my husband doesn't like to have breakfast. (Informant 12).

Appetite

Two (2) of the informants described that the factor that influences their dietary choice depends on their appetite. The following are the quotations from informant 10 and 19 regarding this matter.

> Maybe because we always eat certain kind of food... that we know the food is nice, so we would always eat it... such as *tom yam.* (Informant 10).
>
> Sometimes, the stalls available are the same, so the food available is also the same. There are plenty choices of food, but it does depend on our appetite. (Informant 19).

Limited Food Available

In addition, the factor which also influences this very issue as mentioned by two (2) informants is that there is not much range of food selection at the cafeteria.

> Sometimes I just bring food from home because it's easier if I want to eat rice, as we don't have the time to go down to cafeteria to buy food. At times, only fried foods are available at the cafeteria and it requires some time waiting for the order. (Informant 11).
>
> Urm, there is no choice, the food there is the only available option. (Informant 14).

Habit

Aside from that, another variable would be one's habit, to which two (2) of the informants did mention in their respective interviews. Informant 20 had explained his habit of taking sugary drinks, which makes it hard for him to practise a healthy eating habit.

> Actually, as for me, I would have to stop drinking *teh tarik*. I think if I could stop, it would be better. Then I might have to also stop myself from taking anything with sugar, such as iced tea, but I can't seem to do that. It's like a habit. (Informant 20).

Similarly, informant 12 reported to be having frequent snacks. She did list several snacks that she would frequently have and most of them contain high number of calories.

> I would frequently have snacks, and I especially love to eat biscuits. That's my problem because it becomes a habit and I also like something such as *keropok*... Yes, because even while working, I need to have something to eat such as chocolates. I like that kind of food and I don't know why... Maggi, *keropok*, chocolate, or nuts are few examples. (Informant 12).

Sugary Drinks

Four (4) of the informants reported high intake of sugary drink which might be the factor influencing obesity, given that sugary drinks have high calories.

> For drinks, every time when I eat meals for breakfast, lunch and dinner, I would have sugary drinks. Maybe around six (6) glasses per day, but that includes water. Maybe five (5) glasses of sugary drinks. (Informant 14).

> Urm, about five (5) to six (6) glasses. I always have sugary drinks that are served in plastics. For water, it's only one or two glasses per day. (Informant 17).

> Six (6) to seven (7) glasses per day... Urm, one of them is iced tea, which is a must when working at 9 a.m., then another one sugary drink in the afternoon. Then I would have a cup of hot tea at home, subsequently another one hot drink at night. As for the rest it is mostly water. (Informant 18).

Similarly, informant 20 was asked about the drinks he has for all three main meals, to which he answered that he would have sugar-based beverages, especially at midnight whenever he is on-call. However, when he was asked on the amount along with what he would usually have, he admitted to having a total of 5 glasses, with 20% amounted to be sugary drinks.

It's more than five (5) glasses. About 20% of overall drink intake is sugary drinks. Before sleep, I must drink water. (Informant 20).

Water Intake

Ten (10) informants reported that they do drink water lesser than the recommended daily water intake of six to eight glasses per day.

I always have drinks during meals only. Occasionally, before sleep I would drink one glass of water. So, about 4 to 5 glasses of water in a day. (Informant 1).

Maybe around 5 glasses. Only during breakfast that I would always have sugary drinks. So the remaining 4 glasses would be water. Only in the morning that I have sugary drinks. (Informant 2).

It would be around 5 to 6 glasses. I drink water only during lunch and dinner. (Informant 7).

Maybe about 6 glasses. (Informant 11).

I don't drink plenty of water. In one day, it would be about 4 glasses, including 2 glasses of sugary drinks. (Informant 12).

Depends. At home, the source of water is easier to get, to which I will just drink water taken from the Coway filter. However, at my workplace, it's quite hard to drink water as the distance from here to the pantry is quite far. Therefore, I don't drink much at the workplace. If at my workplace, it's around 2 glasses. While at home, it's more than that. In a day, it's around 5 to 6 glasses. (Informant 13).

For drinks, every time when I eat meals for breakfast, lunch and dinner, I would have sugary drinks. Maybe around six (6) glasses per day, but that includes water. Maybe five (5) glasses of sugary drinks. (Informant 14).

5 to 6 glasses per day. (Informant 15).

Urm, about five (5) to six (6) glasses. I always have sugary drinks that are served in plastics. For water, it's only one or two glasses per day. (Informant 17).

Around 3 to 4 glasses. I always drink water. Sometimes I do have sugary drinks, the average maybe only about once per day. (Informant 19).

Double Portion

Besides these aforementioned factors that might influence the food choice among informants, there are several other factors. One that might have an influence on obesity is having double portion. Informant 10 stated that she tends to eat more than usual if she is not that busy.

> For evening shift, I would eat around 3 p.m. to 4 p.m. If my schedule were to be free, I would end up eating quite a lot, having double portion. Then around 7 p.m., I would eat again. (Informant 10).

Fatigue

In addition, informant 17 further clarified this issue from another aspect, in which tiredness resulted working does cause hunger, thus making her crave for something to eat.

> For the daily tasks, everyday we are always tired and that makes us hungry, always wanting to eat something. (Informant 17).

The data showed the food choice factors including time pressure, convenience, social influence, appetite, limited food available, habit, sugary drinks, and water intake. Table 4.2 presents the summary of data analysis on food choice.

Table 4.2

Summary of Data Analysis on Food Choice as the Factor Influencing Obesity among Healthcare Workers in Kedah

No.	Respondents	Food Choice							
		Time Pressure	Convenience	Social Influence	Appetite *	Limited Food Available *	Habit	Sugary Drinks	Water Intake *
1.	Informant 1	✓	✓						✓
2.	Informant 2	✓	✓						✓
3.	Informant 3			✓					
4.	Informant 4	✓							
5.	Informant 5								
6.	Informant 6		✓						
7.	Informant 7								✓
8.	Informant 8	✓		✓					
9.	Informant 9	✓							
10.	Informant 10	✓			✓				
11.	Informant 11	✓	✓			✓			✓
12.	Informant 12	✓	✓	✓			✓		✓
13.	Informant 13	✓	✓						✓
14.	Informant 14					✓		✓	✓
15.	Informant 15								✓
16.	Informant 16	✓							
17.	Informant 17	✓	✓					✓	✓
18.	Informant 18							✓	
19.	Informant 19				✓				✓
20.	Informant 20						✓	✓	
	Total respondents	11	7	3	2	2	2	4	10
	Percentage of respondents (%)	55%	35%	15%	10%	10%	10%	20%	50%

*Legend: * Newly found factor*

Source: Developed for this research

4.3.1.2 Eating Out

The second factor that was found to influence dietary behaviour among healthcare workers is one's routine to eat out. In this subsection, there were several factors listed by the informants including eat out behaviour, energy dense food, and sugary drinks which further ruling it as a possible cause to obesity. The following are quotations from eight (8) informants who reported to have regularly experienced dining out.

> I usually eat out on working days. I'm too tired to cook. (Informant 1).
>
> For non-working days, at times I would cook, but if I'm too tired, then I would buy lunch instead. (Informant 3).

Both informant 1 and 3 above admitted that they eat out due to a similar circumstance that they are too tired to cook. Informant 17, on the other hand, explained that she prefers to eat out for both breakfast and lunch because she does not have the time to cook.

> I always eat out at the workplace, but it's around 3 p.m. to 4 p.m... It is because I actually don't have the time to cook at home. (Informant 17).

Contradictory to informant 4, who disclosed that she chose to eat out to have different menu for her meals in accordance to her own preference.

> It's because I want something different according to my own preference, something different than what I would usually have at home. (Informant 4).

However, for informant 5, he prefers to eat out as it is more comfortable. It is also because of another social factor, for he has to send his children to school. It has become a personal routine to drop his children off at their school, then eat out for breakfast prior clocking in for work. He also added that he prefers eating at the cafeteria because the varying food selection that is available. As a matter of fact, the price is cheap.

> I always eat out at the restaurant because it's more comfortable and also, I need to send my children to school in the morning. I would take medicine around 7 a.m., then send my children to school around 7.30 a.m. After that, I would make my way to work and once I have clocked in, I would go for a breakfast before I start working at 8 a.m...I would more than often have *bihun, kopi 'o',* or iced tea, and some *kuih*... Likewise, I always eat at the cafeteria because there are many types of food available and the price is cheaper than other places. (Informant 5).

Informant 8 further described that she prefers to eat out during night shifts, given that she would order food along with her friends.

> For the night shift, even at midnight, 12 a.m., we would buy something to eat. As I'm working with my friends, we would order food from outside. Normally, only when working during a night shift that we would frequently order from outside. They then deliver the food directly to the ward. (Informant 8).

Instead, informant 10 stated that she prefers to have breakfast at home. Albeit so, her menu of the day is usually comprised of food from a stall near her house as it is easier to buy from there.

> It is because it's easier to eat at home as the stalls are near to my house, thus making it easier to get food from there. (Informant 10).

Informant 19 was asked on the place he would usually have meals during his breaks and he replied that he too would buy food from the stalls outside of the hospital.

> I normally eat at the stalls outside of the hospital. (Informant 19).

Energy Dense Food

Few medical assistants said that they know everything there is about eating healthy and exercise. Albeit so, two of them confessed that they would always eat energy dense food whenever they dine out in the morning. The following quotations from both informant 19

and 20 are as listed, whereby they provided the commonly chosen menu they would have for breakfast.

> I frequently eat *roti canai, nasi lemak* and at times *nasi berlauk* even in the morning, along with Milo. (Informant 19).
>
> I like to eat *mee, bihun, or nasi goreng* with *teh tarik.* (Informant 20).

In accordance to that, informant 4 who is a nurse also mentioned that she would order heavy meals when she eat out.

> Urm, I do have dinner at home. Though usually it depends on the situation itself. Occasionally, I would eat just bread, but whenever I do dine out, then I would eat something fried like *mee goreng* or *bihun goreng.* (Informant 4).

Sugary Drinks

Aside from that, two (2) of the informants reported that they prefer to order sugary drinks when dining out. This preference can be a possible determinant to obesity, given the known fact that sugary drinks do have higher calories compared to plain water of zero calorie.

> If I eat out, then I would have sugary drinks. If I have lunch at the office, it would be at the pantry, therefore I would just drink water. (Informant 7).
>
> ...if I eat at home, I would drink water as I don't make any sugary drinks. Though whenever I eat out, I would either have *teh tarik* or *Nescafe ais.* (Informant 13).

Fast Food

In addition to that, there is also another factor that further sets 'eating out' as the possible determinant: fast food. This is because the long lists of food served at fast food restaurants are mostly high in calories. Fortunately, only one respondent had admitted

resorting to fast food as an option due to its easy access, making it a challenge in leading a healthy lifestyle.

> Ouh it's quite hard given how this area is located within town, therefore there would be lots of fast food chains and all. Such food is easier to get as it's nearer, it is just next to this place. That's the challenge. (Informant 19).

Based on the findings, it shows that there were three factors of eating out including eating out behaviour, energy dense food, and sugary drinks. Table 4.3 shows the summary of data analysis on eating out.

Table 4.3
Summary of Data Analysis on Eating Out as the Factor Influencing Obesity among Healthcare Workers in Kedah

No.	Respondents	Eating Out		
		Eat Out Behaviour	Energy Dense Food	Sugary Drinks
1.	Informant 1	✓		
2.	Informant 2			
3.	Informant 3	✓		
4.	Informant 4	✓	✓	
5.	Informant 5	✓		
6.	Informant 6			
7.	Informant 7			✓
8.	Informant 8	✓		
9.	Informant 9			
10.	Informant 10	✓		
11.	Informant 11			
12.	Informant 12			
13.	Informant 13			✓
14.	Informant 14			
15.	Informant 15			
16.	Informant 16			
17.	Informant 17	✓		
18.	Informant 18			
19.	Informant 19	✓	✓	
20.	Informant 20		✓	
	Total respondents	8	3	2
	Percentage of respondents (%)	40%	15%	10%

Source: Developed for this research

4.3.1.3 Eating Patterns

The third factor to have influenced dietary behaviour among healthcare workers from the interviews conducted is one's eating patterns which include meal schedule, late night eating, grazing, binge eating, and food addiction. Several eating patterns including meal schedule, late night eating, grazing, binge eating, and food addiction were identified.

Meal Schedule

Sixteen (16) of the informants reported of having irregular meal schedule with irregular meals and irregular eating time as they have to work in shifts.

Irregular Meals

Majority of the informants (14 informants) admitted to having irregular meals of which few tend to skip either breakfast, lunch, or even dinner depending on their respective shift. A number disclosed that they do skip breakfast, while others did say that they take breakfast even though it is not a daily occurrence. The number of breakfast consumption per week varies among the informants. Several reasons as to why they have been leading such a lifestyle include them waking up late and their preference of having breakfast only on working days. Examples of responses regarding breakfast consumption are stated as the following:

> Four (4) to five (5) times per week. I would have breakfast only on working days; for non-working days, I would skip breakfast and have lunch instead. (Informant 1).
>
> Maybe four (4) times per week because I tend to wake up late. Only after woken up that I would skip to having lunch. (Informant 2).

> At times I do have breakfast, though sometimes I don't. There are occasion whereby I don't feel hungry once awake, so I just don't eat. (Informant 9).
>
> Urm, just occasionally... like three (3) to four (4) times in a week because I wake up late. (Informant 10).
>
> It's not that I would have breakfast every day. I would only have breakfast if I have to work during the morning shift. Urm, it depends on the situation, maybe two (2) or three (3) times per week. (Informant 11).
>
> I think about three (3) to four (4) times in one week. If I need to work in the morning, I usually don't take breakfast. Urm, because sometimes when I'm already at the workplace, I would do my work first. After I'm done with some work, if I were to befamished, only then I would eat. Usually I would just drink water. I would at first go for plain water, though later on I would have sugary drinks such as iced tea, but yes I don't really eat anything for breakfast. (Informant 12).
>
> Maybe about three (3) times per week. When I'm scheduled to be working in the morning shift, then I would have breakfast. But if I have to work for the evening shift or at night, then I don't take breakfast. (Informant 14).
>
> In one week, I would only have my breakfast about three (3) times. I don't take breakfast if I have to work for the morning shift. If I'm scheduled to work in the evening, then there it would be no problem. For morning shift, it's quite hard to have regular breakfast, sometimes I don't even have breakfast. (Informant 16).
>
> Maybe about five (5) times in one week... because I wake up late. (Informant 19).

On the other hand, informant 6 reported that she tends to skip lunch, though for informant 8, 15, and 20 their inclination to skipping lunch is simply because they already had breakfast prior that. Informant 8 further explained that whenever she is busy, then she would eat late in the evening for dinner.

> Two main meals. Normally, I would eat in the morning. Then I will not eat lunch, only to eat later on at 5 p.m. (Informant 6).
>
> Because at times it's too busy. Though for other times, as I would still be feeling full given that I already had breakfast, so I tend to skip lunch. In fact, if I start working in the evening, only then I would eat. When it's too busy, then I would eat a bit late around 6 p.m. to 7 p.m. to which considered as dinner. (Informant 8).

> On working days, at times I will not have my lunch. Occasionally, as I have already eaten at 10 a.m., for subsequent meals I would eat at home. But if my friends were to ask me to join them, then I would follow them instead. (Informant 15).

> In the afternoon. During working hour, I do not prefer eating rice for lunch, so I would resort to *kuih*. Especially when I already had a heavy breakfast. (Informant 20).

However, informant 3 mentioned that she tends to skip dinner because she already had somewhat late lunch.

> I always have breakfast and lunch. For dinner, at times I don't take it. However, if I need to work at night, then I would have dinner. Urm, usually I would have a late lunch, so if I have my lunch a bit late then I would not eat rice for dinner. I just have drinks at night. (Informant 3).

Irregular Eating Time

In addition to having irregular meals, a total of ten (10) informants reported having meals at irregular time. When an individual have any of the meal out of schedule, the following meals can be affected as well. Below are further clarifications from the informants on having meals at irregular time.

> Usually we buy *nasi lemak* in the morning, then we eat that for lunch. Because once on duty, we cannot go out to buy food. There is a cafeteria in the hospital, but once we are on duty, we cannot go out to buy food. That's why we would buy food first thing in the morning, so that we can eat it for lunch. (Informant 1).

> We are always in a rush, so we would constantly eat not according to the appropriate time. I mean, the problem is time itself. For night shifts, there is no other choice but to eat during midnight. When it is around 11 p.m. or 12 a.m., only then do we get to eat. (Informant 2).

> If I'm working in the morning, I would eat around 10 a.m. to 11 a.m. So, at the time, it's no longer a breakfast, given that I would be eating for lunch instead. That's for morning shift as the shift starts at 7 a.m. until 2 p.m. For evening shift, it starts from 2 p.m. until 9 p.m.; if I have time, I would eat. If not, I would find something when I got home at night... we don't have specific time for break. Therefore, we don't have a regular eating time, one that would follow specific time for breakfast or lunch and all that – we really don't have it. When I do have a shift in the evening, I would have breakfast at home and then I would occasionally skip lunch only to eat later in the evening. (Informant 8).

> It's not fixed given that at times, I don't have the time to eat since there is no specific time for a break. So when I do have time to spare, I would go and eat. Around 10 a.m., if I have the time, I would go to eat. Usually it's around 10 a.m., 11 a.m., or 12 p.m., though sometimes I don't even get to eat lunch. I would only have lunch once I have gotten home. The challenge is that it's hard for us to eat at appropriate time. (Informant 9).

Informant 9 was asked about the challenges in maintaining a healthy lifestyle, to which she replied that it's hard for them to eat at appropriate time. Likewise, informant 6 would have meals at irregular time; when she was asked of the specific time, she would more than often have her lunch, though around 4.30 p.m.to 5 p.m. instead. As for dinner, she admitted to be having it at 5 p.m., probably combined with her 'lunch' she had previously clarified.

> Urm, I would have my lunch around 4.30 p.m. to 5 p.m. On working days, I would have dinner in the ward. I would always eat around 5 p.m. After that, once I have gotten home, I would eat something like bread. (Informant 6).

As for informant 13, he stated that he would have dinner after he have finished working around 9.30 p.m. or 10 p.m. Similarly, informant 14 and 19 also stated that they have lunch and dinner quite late. Informant 17 then reported that she too has breakfast and lunch fairly late. Besides, when she was asked about the challenges in adapting a healthy lifestyle, she answered the fact that there is no specific time to eat.

> As for me, I usually have to work for the evening shift. I would finish working at 9 p.m., so around 9.30 p.m. or 10 p.m., only then I would have dinner. (Informant 13).

> When I do have work scheduled, then I would have lunch quite late, maybe around 3 p.m. If I have to work in the morning, I would eat around 2 p.m. to 3 p.m. If I'm working in the evening, then dinner would be around 9 p.m., that is once I have gotten home. (Informant 14).

> I would have lunch a bit late given that I have already had a heavy breakfast. So, it would be around 2 p.m. to 4 p.m. For dinner, I would eat around 10 p.m. when I got home from work. (Informant 19).

> For evening shift, I have breakfast from 10 a.m. to 11 a.m., then I would have lunch in between 4 p.m. to 5 p.m. Urm, I cannot adjust the right time to eat. It's like whenever we have the free time, only then we can eat. If we don't, then we cannot eat. The challenge to this is that there is no specific time to eat... (Informant 17).

However, for informant 16, she described that she would more than often have a late breakfast at around 10 a.m. to 12 p.m. and the meal taken at that time would also include lunch.

> For morning shift, if I have the time for breakfast, it (her meal) would be about 10 a.m. to 11 a.m. Only if I were to be free that I would eat around that time. Sometimes that would include lunch. Though at other times, it would be around 11 a.m. or 12 p.m. because I don't have the time to have my breakfast. (Informant 16).

The other eating patterns that were explained by the informants are inclusive late night eating, grazing, binge eating, and food addiction. The informants have also reported of having abnormal eating patterns which might be due to the shift-working hours and stress. Eating patterns which are related to emotional eating among the informants are binge eating and food addiction.

Late night eating

As the healthcare workers are working in shifts, some of them are reported to be eating at late night especially for those who are working during the night shift in the hospital. The following are related quotations from eight (8) informants who stated that they do eat late at night.

> For night shift, there is no other choice, but to eat at midnight. Only when it gets around 11 p.m. or 12 a.m. that we would get to eat. As we need to stay awake, we have this need to drink. When it hits midnight, I am used to drinking coffee just to stay awake. From the start of night shift until the next morning, I need to at least drink something... like sugary drinks or just eat about anything, so that I will not feel sleepy. (Informant 2).

> For night shift, even in the middle of the night at 12 a.m. we would buy something to eat. Given that I do work alongside my friends, we would order food from outside. Normally for night shifts, we always order from outside, to which they will then deliver the food directly to the ward. (Informant 8).

> For night shift, we would always eat at 12 a.m. We would eat quite heavy food at that time, like we would order *bihun sup* or *koey teow ladna*. (Informant 9).

> But when I need to work during the night shift, I would eat more than usual. I mean, I already had breakfast, then lunch, even when I want to go to work, I would eat again, and then at night I would still order food. That's for the night shift... For night shift, I would eat just once. I mean around 12 a.m. or 1 a.m., only then I would eat. (Informant 10).

> When working during the night shift, we always have dinner at 11 p.m. or after 1 a.m. As for me, I would order *bihun sup* from a restaurant outside of the hospital. (Informant 12).

> I would buy food when on night shift duty. I would buy food as I have to work at 9 p.m. So I would eat around 10.30 p.m. to 11 p.m. Urm, I don't eat rice at that time. I don't really prefer ordering rice. I would always order a dish with soup as its base such as *bihun sup*. It's actually quite a heavy meal. (Informant 16).

> For night shift, before I go to work, I would eat at home around 7 p.m. to 8 p.m., then I would eat again at my workplace at 1 a.m. or 2 a.m. I do have heavy meal such as *nasi goreng* that I would buy from nearby restaurants. (Informant 17).

If I were to be on-call, I would eat at 1 a.m. I would have *teh tarik* and if there is *roti canai*, I would eat *roti canai.* (Informant 20).

Grazing

Besides having late night eating, few of the informants are reported with grazing behaviour. Grazing is an abnormal eating pattern that involves consuming small amounts of food almost constantly, eating various kinds of food (Mas et al., 2017). The following are quotations from nine (9) informants about grazing behaviour.

I always eat biscuits. As I usually have my breakfast around 7 a.m., so around 12.30 p.m., I would drink coffee with biscuits instead. (Informant 3).

I have snacks about two (2) to three (3) times per day. Things like *kuih*, biscuits, or something along the line. (Informant 4).

I would have snacks maybe around two times a day. Like right now, around 3 p.m. I would have some snacks such as *kerepek*. Sometimes I would buy them from the stalls near this area or at the cafeteria. Something like *maruku*, *kerepek*... something like that. (Informant 5).

Urm, I have snacks quite frequent. I would buy, maybe something like biscuits or *kuih*. But I would always eat *kuih.* (Informant 6).

I frequently have snacks. Actually because we have stock of snacks quite a lot in the pantry. So, during the time between 10 a.m. to 12 p.m. we would have some snacks. Then after lunch, around 3 p.m. to 4 p.m. before going back, we would have snacks and sugary drinks once again together. At times we would have biscuits, other times we would have *keropok.* (Informant 7).

While working, I always find myself munching on something like *keropok*. Maybe about 2 times a day. I just buy them from the cafeteria. (Informant 9).

I have snacks in the evening. When I get home in the evening around 5 p.m., while surfing the internet, I would eat something like biscuits, *keropok*, or bread. Maybe two (2) times in a day. I would buy the snacks...like from Tesco. (Informant 18).

Informant 12 stated that she would frequently have snacks. The researcher asked for clarification if she would always eat snacks in between meals and she agreed that she does. She then further listed several snacks that she would frequently eat; most of them are snacks with high calories.

> I would frequently have snacks, and I especially love to eat biscuits. That's my problem because it becomes a habit and I also like something such as *keropok*... Yes, because even while working, I need to have something to eat such as chocolates. I like that kind of food and I don't know why... Maggi, *keropok*, chocolate, or nuts are few examples. (Informant 12).

Informant 10 stated that she rarely has snacks, maybe about five to six times in one week. However, most confectioneries she had mentioned are food that might increase one's body weight given how high in calories they are.

> I don't really eat snacks. But sometimes I would buy them like five (5) to six (6) times a week. That's if I do go out. I always buy something like *keropok*, chocolate, or ice cream. (Informant 10).

As for being stress while working, a total of ten (10) informants were reported to experience it. Out of those ten (10) informants, four (4) of them mentioned that their dietary behaviour would be the same when under stress, similarly as to what was reported from informant 8, 10, 14 and 19. While another six (6) stated that they have different dietary behaviour when they are stressed out. In this study, a number of informants were observed to be experiencing emotional eating. Emotional eating or also known as emotional hunger is the consumption of food as a response to negative emotions, instead of a way to satisfy hunger, it is more applicable as a way to deal with negative feelings (Mas et al., 2017). The abnormal eating patterns that are related to emotional eating among the informants are binge eating and food addiction.

Binge Eating

Five (5) of the informants admitted that they tend to eat more when they are under stress. The following are the expressions from the informants who tend to eat more when stressed out.

> At this moment, the workload is quite a lot because there are too many patients. It's quite stressful. Urm, sometimes I tend to eat a lot. When I get home I tend to eat so many things. (Informant 1).

> For daily tasks at the workplace... It is at times pleasing, but at times quite stressful. Because sometimes when it's too busy, when the ward is full, then we don't even have time to eat. Not only we don't have time to eat, even if we want to drink water, we don't have time for that. I could say that my dietary behaviour would change because I tend to eat more. (Informant 4).

> I could say that nowadays it is very stressful. It becomes stress due to heavy workload while the number of staffs is not increasing. I could say, when I'm stress usually I would eat more than usual. When I keep eating, then I forget about the problem. (Informant 5).

> When I'm stressed I would eat, sometimes I do eat heavy meals. Actually I have lost some weight before then when I'm stressed I would gain weight again. So I cannot feel stressed because when I'm stressed I would eat. (Informant 12).

Meanwhile for informant 3, she did not exactly mention that she tends to eat a lot when she is stressed out. Though she did say that it is hard to adapt a healthy eating habit when she is in such condition.

> I have tried to diet before to control body weight... When we are in the state of stress, then it's hard to control things like that. (Informant 3).

Food Addiction

Two (2) informants reported to be consuming certain kind of food when under stress which can be considered as food addiction. Food addiction involves eating certain kind of food almost systematically without planning the amount that is going to be consumed before the person starts eating (Mas et al., 2017). Informant 12 was asked about the main problem of her work, to which she answered: experiencing stress while working. She was then further asked about her dietary behaviour being under such condition whereby she admitted having the tendency to eat anything sweet.

> Urm, it would be different. I like to eat when I'm stressed. I like to eat sweet foods such as Kitkat or some biscuits. As for me, my style to relieve stress is not towards people but towards the food. (Informant 12).

Similarly, informant 17 also has the tendency to eat a specific kind of food when stressed.

> If I'm stressed, I eat lots of *keropok*. (Informant 17).

Table 4.4 below displays the data summarisation on the informants' eating patterns.

Table 4.4
Summary of Data Analysis on Eating Patterns as the Factor Influencing Obesity among Healthcare Workers in Kedah

No.	Respondents	Eating Patterns				
		Meal Schedule	Late Night Eating	Grazing	Binge Eating	Food Addiction
1.	Informant 1	✓			✓	
2.	Informant 2	✓	✓			
3.	Informant 3	✓		✓	✓	
4.	Informant 4			✓	✓	
5.	Informant 5			✓	✓	
6.	Informant 6	✓		✓		
7.	Informant 7			✓		
8.	Informant 8	✓	✓			
9.	Informant 9	✓	✓	✓		
10.	Informant 10	✓	✓	✓		
11.	Informant 11	✓				
12.	Informant 12	✓	✓	✓		✓
13.	Informant 13	✓				
14.	Informant 14	✓				
15.	Informant 15	✓				
16.	Informant 16	✓	✓			
17.	Informant 17	✓	✓		✓	✓
18.	Informant 18			✓		
19.	Informant 19	✓				
20.	Informant 20	✓	✓			
	Total respondents	16	8	9	5	2
	Percentage of respondents (%)	80%	40%	45%	25%	10%

Source: Developed for this research

4.3.2 Job Stressors

The second main theme to this study is the job stressors. As described in the previous subsection, half of total informants, with ten (10) reported to experience stress at their

workplace. More than half of those who are reported with stress experience emotional eating. Six (6) out of ten (10) informants admitted their dietary behaviour do change when experiencing stress as they stated that they tend to eat more than usual and would consume certain types of food. This section comprises of five other sub-themes including job demand, inadequate staffing levels, inadequate equipment availability, organisational climate, and social factor.

4.3.2.1 Job Demand

Eight (8) informants had mentioned the job demand at their workplace as a job stressor. Some of them talked about workload, while the others explained that they are stressed from having too many patients in the ward.

Workload

Six (6) informants had explained the factors that would cause them to be stressed, though mostly is derived from the workload they have. Below are the excerpts from informants who reported to have stress while working, to which instigated by their own workload.

> At this moment, the workload is quite a lot because there are too many patients. It's quite stressful. (Informant 1).
>
> The workload is a lot. There are lots of task to do... (Informant 3).
>
> There are a lot of workloads. (Informant 4).
>
> If you ask anyone about this, I could say that nowadays it is very stressful. It becomes stress due to heavy workload while the number of staffs is not increasing. (Informant 5).
>
> But at the workplace it's quite stressful due to the workloads. Sometimes suddenly we need to settle up so many things and we need to do it while rushing so it's quite stressful. (Informant 10).

It's okay, just that it's quite stressful. Urm, from the environment and the workload. (Informant 17).

Too Many Patients

There are also six (6) informants who believed that the very factor that has caused them to be stressed out is the wave of patients. The following are quotes from said informants regarding this matter.

At this moment, the workload is quite a lot because there are too many patients. It's quite stressful. (Informant 1).

For the environment at the workplace, there are too many patients in my ward. The workload is a lot. (Informant 3).

The problem as I have said before it's stressful. Maybe because we are too busy. For example, the patients for my ward should be around 20 patients, but sometimes when there are too many patients like it reached until 40 patients, then it is stressful. Even the staffs are not enough, only 4 staffs. (Informant 4).

After that, when the ward is full and the beds are full, but they want to admit more patients, so it's quite stressful. (Informant 10).

Urm, actually it depends on patients. If there are so many patients, then it's quite stressful. If not too many patients, then it's quite relaxed. (Informant 14).

Sometimes it's quite stressful with so many patients. (Informant 19).

4.3.2.2 Inadequate Staffing Level

Besides the job demand, two (2) of the informants explained that there are not enough staffs, to which not in proportional to the number of patients in the ward, thus making it even more stressful. The quotations from informant 4 and 5 are stated as the following:

The problem as I have said before it's stressful. Maybe because we are too busy. For example, the patients for my ward should be around 20 patients, but sometimes when there are too many patients like it reached until 40 patients, then

it is stressful. Even the staffs are not enough, only four (4) staffs. Sometimes only three (3) staffs. (Informant 4).

It becomes stress due to heavy workload while the number of staffs is not increasing. (Informant 5).

4.3.2.3 Inadequate Equipment Availability

Three (3) informants who were reported with stress at the workplace also stated that another problem they have to experience is the lack of provided equipments at the hospital. Here are further explanations from informant 1, 3, and 10 regarding this matter.

Sometimes the equipments provided are not enough with the number of patients. (Informant 1).

Urm, the problems that we normally have like not enough staffs, not enough equipments, and with bosses who demand unnecessary things. (Informant 3).

After that, when the ward is full and the beds are full, but they want to admit more patients, so it's quite stressful. (Informant 10).

4.3.2.4 Organisational Climate

Organisational climate can be referred to as the conflicting communication styles (NIOSH, 2008). This factor was mentioned by informant 3 and 12 as they stated that they were stressed out because of the demand from upper management.

Urm, the problems that we normally have like not enough staffs, not enough equipments, and with bosses who demand unnecessary things. (Informant 3).

Stress from the upper management. It's stressful because we have many bosses with different instructions given which makes us confused which one is right. (Informant 12).

4.3.2.5 Social Factor

Based on the explanation from the informants, the researcher had grouped factors that are associated with the patient or co-workers' behaviour as the social factor. The following quotations from three (3) informants including informant 5, 8, and 10 are of their experience to be under stress from social factors shown as the following:

> As I have mentioned before, it is stressful to work in health sector as the technology keeps improving, the workload keeps increasing, the complaints from staffs and others. So, it's very stressful. (Informant 5).
>
> Just sometimes it's a bit stress because of different types of behaviour from patients and their family members. (Informant 8).
>
> Moreover when I need to replace my friends when they applied for MC or EL, then all of these things make me stress. Just sometimes as I said before, suddenly we don't know about the situation then we need to replace other staffs, so it's quite stressful. (Informant 10).

Busy

Only informant 4 mentioned that she would become stressed while working given the busy state of her workplace.

> The problem as I have said before it's stressful. Maybe because we are too busy. For example, the patients for my ward should be around 20 patients, but sometimes when there are too many patients like it reached until 40 patients, then it is stressful. Even the staffs are not enough, only 4 staffs. (Informant 4).

Other Possible Problems That Might Cause Stress

Besides the factors mentioned above regarding the factors which might cause stress at one's workplace, few other informants who did not mention experiencing any particular stress of their own, instead had brought up other problems, without linking any of it to stress. The following are list of problems stated during the interview. Informant 2, 16, and 17 did mention issue pertaining time pressure.

> The problems include so many patients, and then we don't have time to eat. Sometimes we don't even have time to go to toilet. (Informant 2).
>
> I think, the problem is always about time. We have to start working early, but we cannot go back early. Sometimes we don't even have time to eat. (Informant 16).
>
> Urm, I cannot adjust the right time to eat. It's like when we have free time then we can eat. If we don't have free time, then we cannot eat. (Informant 17).

Meanwhile, informant 6 and 11 talked about not having enough staffs, to which further clarified by informant 15 whereby the general issue here is how hard it is to find a replacement staff if one of the staffs were to be on leave, or worse told the management at the eleventh hour.

> Urm, heavy workloads. Everything they want to be finished up quickly and not enough staffs. (Informant 6).
>
> In my ward, at this moment we don't have enough staffs. Because sometimes some of the staffs MC, some of them further studies, sometimes EL because their children are sick and also the equipments are not enough. As we have so many patients, sometimes when we want to examine them, then the equipment is not enough, sometimes it's broken, and sometimes with no battery. These are the problems. (Informant 11).
>
> Just sometimes when the staffs do not come to work and they tell us last minute so it's hard to find someone to replace. (Informant 15).

Table 4.5 shows the summary of data analysis on job stressors as the factors influencing obesity among healthcare workers.

Table 4.5
Summary of Data Analysis on Job Stressors as the Factors Influencing Obesity among Healthcare Workers in Kedah

No.	Respondents	Job Stressors				
		Job Demand	Inadequate Staffing Level	Inadequate Equipment Availability	Organisational Climate	Social Factor
1.	Informant 1	✓		✓		
2.	Informant 2					
3.	Informant 3	✓		✓	✓	
4.	Informant 4	✓	✓			
5.	Informant 5	✓	✓			✓
6.	Informant 6					
7.	Informant 7					
8.	Informant 8					✓
9.	Informant 9					
10.	Informant 10	✓		✓		✓
11.	Informant 11					
12.	Informant 12				✓	
13.	Informant 13					
14.	Informant 14	✓				
15.	Informant 15					
16.	Informant 16					
17.	Informant 17	✓				
18.	Informant 18					
19.	Informant 19					
20.	Informant 20	✓				
	Total respondents	8	2	3	2	3
	Percentage of respondents (%)	40%	10%	15%	10%	15%

Source: Developed for this research

4.3.3 Working Conditions

The third main theme to this study is the working conditions which comprised of five sub-themes, emerged from informants' experience at the workplace, another few possible factors influencing obesity among healthcare workers. These include time pressure, co-workers' influence, food environment at the workplace, work schedule, and activities at the workplace.

4.3.3.1 Time Pressure

Twelve (12) informants reported that due to their shift working hours, they do not have time to exercise, neither do they exercise on the weekends. Informant 13 and 14 stated that they do not exercise given the lack of time. Along with other informants who too stated that time pressure prevents them from exercising regularly, to which they later on relate it with several other reasons.

> I rarely do exercise on working days. No time for that. (Informant 13).
>
> I don't do exercise on working days because of time. As we are working shift hours then it depends. Sometimes we need to work double shifts, sometimes we need to work for 14 hours. (Informant 14).

Social Factor

Three (3) informants including informant 5, 7, and 18 explained that the reason why they do not have the time to exercise in the evening is because of their parental duties. Once getting off work, they would have to pick up their children from school.

> I don't do exercise. It's because of time pressure. Because we finished working at 5 p.m., then there is traffic and I need to pick up my children, so it takes about 1 hour to get home. Then when will I have time to exercise? And then for weekends my children have to attend tuition. I need to send them to tuition and pick them up

from tuition then at the end I don't exercise because there are so many commitments. My style of exercise, I just do brisk walking. In this hospital, I walked around this hospital on working days. For weekends, I walked around the supermarket and use the stairs. However, I don't do exercise such as aerobics and all that. (Informant 5).

I don't do exercise. There is no time for that. Firstly, we finished working about 5 p.m., then I need to pick up my children from school. For weekends sometimes I do exercise such as jogging or brisk walking. Maybe about one to two times per week. (Informant 7).

On working days, the exercise is walking in the hospital. But I don't do any exercise. Firstly, I would say that it's busy and we don't have time. We finished working at 5 p.m., and then I have to pick up my children from school, with so many commitments, so I cannot do the exercise. For weekends, I go to recreation park with my children, but I don't do exercise like jogging and all that. (Informant 18).

In addition, informant 6 mentioned as for herself, she is too busy managing her still small children, likewise with informant 17 who has to juggle between work and her responsibility as a mother, taking care of her children.

I have never done any exercise because I'm very busy, as I have small children. (Informant 6).

Urm, I don't do any exercise, just walking. Urm, I don't have time for that because I have to work and at home I have to take care of my children. (Informant 17).

On the other hand, informant 1 and 8 rarely exercise given how her schedule seems to be conflicting with other companions to even exercise together.

Sometimes it's hard to do activities because the working time is different than others. (Informant 1).

For weekends I don't really go for jogging or exercise. Maybe once for a few months when sometimes my husband and I have the same day off. Because we always need to work, so no holidays. I mean sometimes for normal day that I don't have to go to work, but my children need to go to school and my husband have to work. So, more time is spent at home. (Informant 8).

While majority of the informants, with sixteen (16) of them reported that they do not exercise due to time pressure along with other given factors, four (4) informants do exercise on a regular basis. The following are quotations from informant 3, 4, 15, and 19 who do exercise.

> I have joined zumba. I joined zumba like 2 times per week. Sometimes I go for jogging or I walked around the area near my house in the evening. (Informant 3).
>
> I do exercise on working day but only once per week, I do zumba at the workplace... it's one hour. There are 4 times per week. But I only joined once per week. (Informant 4).
>
> Sometimes I do exercise, 3 times per week. Because if I do it every day I would have muscle pain. Just brisk walking. I used to run before but now I have muscle pain. If I go to parks, it's quite long about 40 minutes to 1 hour. If I do gardening it's more than that. (Informant 15).
>
> Urm, sometimes I play futsal. That's it. Usually once per week. About one hour or one hour and a half for every session. (Informant 19).

Consider Movements at the Workplace as Exercise

As for informant 11, she explained that the reason why she does not exercise is due to the fact she has no time for it. In fact, she considered that movements done at her workplace, given that she moves a lot, is already a workout.

> I don't really do exercise on working days. Because we already moved a lot while working and we are busy, we don't have time to do exercise. As I lived at the quarters in the hospital, so every day I just walk to go to work and going back to my house. It's the same for weekends. No exercise. I don't have time to exercise. (Informant 11).

However, for informants who did not mention time pressure as one of the reasons, there were few who shared the same opinion as previous informant. Whereby they consider their movements at their respective workplace as an exercise.

Urm, on working days I only exercise at the workplace because at the workplace we don't really get time to sit. Like for one shift we are working for 7 hours and from that around 5 hours we need to stand or walk. (Informant 2).

I don't do any exercise at the workplace but I have to walk a lot at the workplace. (Informant 8).

I don't do exercise on working days because we already have to walk a lot while working. It's considered as exercise right? (Informant 9).

Honestly, I have never done any exercise on working days. On working days we already have to walk a lot. So, it's considered as exercise. (Informant 12).

The stalls are quite far. Then after working hours, I have to walk quite far to the parking area. For weekends I just push the trolley at Tesco. (Informant 20).

Health Factor

In addition, informant 20 further explained that he used to exercise before, but unable to do it anymore due to his health condition.

Actually since 3 years ago, I was working in Alor Setar, so I don't have time as I have to drive a long distance and arrived home at night, and I was so tired when I get home. This year, I started working here, so I have planned to start exercise. So for about 3 to 4 months I went hiking to one of the hills here for about 2 to 3 times per week. At the beginning it was okay but then I feel numbness around my feet. So I was thinking why I feel that way. Then around April or May it becomes worsen. So I went to check the blood pressure and the blood glucose level and everything was normal. After that, only then I know that I have meningioma. Now it's getting better. (Informant 20).

Fatigue

Besides that, one of the informants stated that she does not exercise on working days due to both lack of time and fatigue. Neither does she exercise on the weekends.

> I don't do exercise on working days. Urm, I don't have time for exercise, because I'm already tired. I don't do exercise during weekends but sometimes I bring my children to recreation park. It's been quite a long time that I have had exercise. In the past, I went for jogging with my husband, but now no more such activities. (Informant 16).

Similarly, informant 10 reported that she does not exercise because of how tired she would be after work, although it is mostly due to her weight.

> I have never done any exercise. Urm, maybe because of fatigue as well as my weight. (Informant 10).

4.3.3.2 Co-workers' Influence

Besides time pressure, the informants also reported their co-workers' influence at the workplace might have also affected their dietary behaviour. Half of the overall informants had discussed on how their co-workers have influenced them, supported by the following quotations from ten (10) informants.

> It depends if someone takes the order, if no one takes the order of food then I don't take lunch. Then, when I get home, I will have lunch. (Informant 1).
>
> Sometimes my friends helped me to buy the food. Urm, it's up to them what they want to buy. (Informant 3).
>
> For the influence, I think it's because of friends. Sometimes my friends bring some food to the workplace. For example, today one of my friends brought some *kuih* and put it in the pantry. So whoever wants to eat it, they can have it. So it's

always like that. I think the challenge comes from friends, if we want to consider from the food perspective. (Informant 4).

It's because when my friends bring the food to workplace and they invite us to eat the food then it's hard to say no. (Informant 6).

Since we eat in the pantry at the workplace, it depends on what others bring their foods at the workplace. So it depends, if someone brought *nasi lemak*, then I would eat *nasi lemak*, if someone brought *roti canai*, then I would eat *roti canai*. But it's always a heavy breakfast. For breakfast and teatime we always eat the same things. (Informant 7).

... sometimes when my friends bring the food from home then we would eat together. Sometimes, like when I want to diet, I want to control what I eat, but my friends bring various kinds of food so everyone is like "there is no diet for today, just eat". So, it's one of the challenges. (Informant 8).

Urm, I think it's the environment. Including friends as when they order tasty meals we would like to order with them. (Informant 9).

Urm, sometimes it's the same but sometimes it's different. Because we always order from the same place so sometimes we just ordered the same thing. The challenge at the workplace comes from my friends. For example, when I say I want to diet, then suddenly they asked me to join them to eat, then from there I cannot diet. (Informant 10).

I eat the meals with my friends. Usually they would ask me to join them, so I just follow them. We order the same menu. (Informant 12).

I have snacks about 2 to 3 times like that in one day. Usually my friends bring the snacks. (Informant 14).

4.3.3.3 Food Environment at the Workplace

Aside from that, four (4) informants reported about the food environment at their workplace. Informant 5 prefers to be having meals during break time at the cafeteria as there are so many choices of food available and the price is cheaper.

> I always eat at the cafeteria because there are many types of food available and then the price is cheaper. Moreover, it is quite hard to go out to eat as we are on working hours and the break time is quite short. (Informant 5).

Similarly, informant 16 also mentioned that she prefers to eat rice at the workplace because there are various types of side dishes.

> If at the workplace, I would eat rice. There are various types of side dishes. (Informant 16).

Other than that, informant 17 and 18 mentioned that there are people who come to the ward and sell some food.

> Urm, at the workplace, there are people that come to ward and sell *keropok*. Sometimes the seller from outside or staffs from other places come to ward and sell the food. They also sell heavy food such as *koey teow goreng* and *nasi lemak*. (Informant 17).
>
> Sometimes in the pantry they sell something. (Informant 18).

Then, informant 18 further explained that there has always been eating occasions at the workplace.

> But most of the time there are always eating occasions to the staffs such as to celebrate birthday of the staffs and then farewell for the undergraduate students who are doing the practical here... there are always eating occasions. In one week, at least there are three times. Sometimes from the supplier, as we buy the equipments for the hospital, the companies have to supply them. When we buy equipments with high costs the companies would provide eating occasion for the staffs. (Informant 18).

4.3.3.4 Work Schedule

Twelve (12) informants mentioned that their work schedule has reformed their eating behaviour and sleeping pattern. One of the informants stated that she would consume more amount of food on the days she has to work for the night shift. There are other informants whose sleep pattern becomes irregular due to similar schedule.

Eating

Informant 10 reported that she would eat more than usual whenever she is scheduled for night shift.

> But when I need to work for the night shift, I would eat more than usual. I mean, I already had breakfast, then lunch, even when I want to go to work I would eat again, and then at night I still order the food. I mean around 12 a.m. or 1 a.m. I would eat. (Informant 10).

Irregular Sleep

Majority of the informants are reported with irregular sleep, given their working hours, especially when they are required to work according to shifts.

> I sleep around 11 p.m. and wake up at 5.30 a.m. During night shift, I start to work at 9 p.m. until 7.30 a.m. then when I get home, I sleep around 8 a.m. to 9 a.m. (Informant 1).
>
> On working days around 5 hours. For the night shift, when I get home around 8 a.m. on the next morning I would sleep until afternoon. (Informant 2).
>
> For the night shift it would be different. Our routine would change a bit. During the day for night shift, I would sleep in the evening around 4 p.m. until 5.30 p.m. like that to gather energy for night shift. So, it's like that. Then after get home from the night shift of course I need to sleep first. After that I would wake up around 12 p.m. to settle up my family matters like I need to pick up my children from school and all that. (Informant 3).

For the night shift I started working at 9 p.m. and finished at 7 a.m. For the night shift, I would sleep the next morning at 10.30 a.m. and wake up at 1 p.m. After that, I don't sleep anymore. (Informant 6).

If I worked for evening shift, then I would sleep around 5 hours. When I get home, I need to do household chores, then at night around 12 a.m. only then I get to sleep. Sometimes around 1 a.m. because I have to take care of my children until they sleep. For the night shift I don't sleep until I get home in the morning, then I sleep. So I don't sleep at all at night**.** (Informant 8).

It depends, sometimes if I work for evening shift, I would sleep around 12 a.m. and wake up around 5 a.m. For the night shift, I get home around 8 a.m. to 9 a.m. then I would sleep. After that, around 11 a.m. I wake up to pick up my children from school. (Informant 11).

I'm not sure about that, sometimes just 3 hours. When I get home from work I would do household chores, like tidy up my house. Then I sleep around 2 a.m. like that and I wake up at 5 a.m. That's if I have to work for morning shift, but if I have to work for evening shift, then I would sleep more. For the night shift, during duty at night I don't sleep at all but when I get home I would sleep around 4 hours because after that I need to cook for my nephew/ niece. (Informant 12).

I sleep from 1 a.m. to 5 a.m., so 4 hours. (Informant 15).

Sometimes I have to work for night shift. For the night shift, I have to sleep during the daytime. The night shift always 3 days. So, for the first day it's okay. Then for the second day, when I get home, I would sleep until around 12 p.m. or 1 p.m. I get home around 7 a.m. then I sleep at 8 a.m. and wake up in the afternoon. (Informant 19).

Informant 4 and 7 likewise admitted to having inadequate hours of sleep.

On working days sometimes I sleep around 5 hours. Sometimes I sleep at 12 a.m., but sometimes around 11 p.m. Yea, for the night shift I think I don't have enough sleep because when I get home around 8 a.m. or 9 a.m., only then I could sleep. Then around 12 p.m. or 1 p.m. I wake up. After that, I don't sleep until around 3 p.m. then I would sleep again until around 5 p.m. After that, I need to wake up for prayer. So, I think I don't have enough sleep. (Informant 4).

For working days, if there is no oncall then I would have enough sleep. I would sleep around 11 p.m. and wake up at 6 a.m. So, I would sleep about 7 hours on working days if there is no oncall. If there is oncall, then I don't have enough sleep. (Informant 7).

4.3.3.5 Workplace Activities

One informant did explain that in the past, the hospital had organised morning exercise. Unfortunately, this activity no longer prolongs until today.

> In the past they organised morning exercise, however right now there is no more activity like that whether morning exercise or evening exercise. (Informant 5).

In fact, informant 9 admitted to joining the aforementioned program when it was around, though she did not manage to be involved to the end.

> The hospital had organised a campaign like they conducted activities such as zumba... I have joined zumba and attend the seminar. Also for those with weight problem, they can join a program called '*jom kurus*'. I have joined the program but I did not join until the end. (Informant 9).

On the other hand, two (2) of the medical assistants reported that the main challenge in upkeeping with healthy lifestyle is the nature of sedentary activity at their workplace.

> There is too long time for break and too many places to relax that makes it harder to follow healthy lifestyle. (Informant 7).

> Urm, sometimes it depends on our work. Sometimes when it's too relaxed then we don't move much. (Informant 14).

4.3.4 Other Factors

There are several other factors derived from the data which can be possible determinants of obesity for this study.

Childhood Obesity

One of the informants explained that she has been obese since she was small.

> As for me, as healthcare workers we need to maintain our weight. But I'm already obese since I was small, and then after giving birth to my children, then the body weight increased more. Sometimes I have tried to lose weight with my friends. Sometimes my friends asked me to join them diet. (Informant 8).

Psychological Factor

Informant 3 looked at it from another perspective, that psychological factor may have influenced her dietary behaviour instead.

> I'm the type of person... it's not that I'm hungry, but maybe because of psychological factor. It's like if I don't eat, I will feel hungry, or I will be tired. So I think it's a psychological factor. (Informant 3).

Table 4.6 shows the summary of data analysis on working conditions as the factors influencing obesity among healthcare workers.

Table 4.6

Summary of Data Analysis on Working Conditions as the Factors Influencing Obesity among Healthcare Workers in Kedah

No.	Respondents	Working Conditions				
		Time Pressure	Co-workers' Influence	Food Environment at the Workplace	Work Schedule	Workplace Activities*
1.	Informant 1	✓	✓		✓	
2.	Informant 2				✓	
3.	Informant 3		✓		✓	
4.	Informant 4		✓		✓	
5.	Informant 5	✓		✓		✓
6.	Informant 6	✓	✓		✓	
7.	Informant 7	✓	✓		✓	✓
8.	Informant 8	✓	✓		✓	
9.	Informant 9		✓			✓
10.	Informant 10		✓		✓	
11.	Informant 11	✓			✓	
12.	Informant 12		✓		✓	
13.	Informant 13	✓				
14.	Informant 14	✓	✓			✓
15.	Informant 15				✓	
16.	Informant 16	✓		✓		
17.	Informant 17	✓		✓		
18.	Informant 18	✓		✓		
19.	Informant 19				✓	
20.	Informant 20	✓				
	Total respondents	12	10	4	12	4
	Percentage of respondents (%)	60%	50%	20%	60%	20%

*Legend: * Newly found factor*

Source: Developed for this research

4.3.5 Strategies to Control and Prevent Obesity

The data also shown several strategies suggested by the informants in order to encourage a healthy lifestyle, simultaneously helping to control and prevent obesity. The following are the mentioned strategies.

4.3.5.1 Strategies Related with Exercise

One of the suggestions given by the informants is to increase physical activities by doing exercises, which can be breakdown as the following.

Organise Programs

Majority of the healthcare workers in this study, fifteen (15) out of twenty (20) informants suggested that hospitals should organise exercising programs and campaigns that would promote healthy eating among staffs.

> The need to organise programs for hospital staffs. (Informant 1).
>
> Urm, they need to organise campaign for healthy lifestyle. Then the way to decrease weight maybe by conducting some programs. For example, in our hospital there was a program called *jom kurus*, so maybe they can continue the program. (Informant 2).
>
> Activities such as zumba, aerodance, fun run, and then hiking. (Informant 3).
>
> I would like to suggest them to organise activities such as '*jom kurus*' and 'go fit' but the activities should be held for longer duration so that we can see the effectiveness. For example, maybe around 3 months. (Informant 4).
>
> Encourage the staffs to participate in healthcare activities. If possible organise some healthcare activities at the workplace. As I have said before, maybe organise exercise program on Thursday evening as on Thursday we go back earlier. Or maybe organise morning exercise. (Informant 5).

Maybe make programs such as training that is conducted to police and make it necessary for the staff to join. As for the healthcare workers, of course it's not the tough training, but at least once a week organise programs such as aerobics. (Informant 7).

Urm, maybe organise some programs to the staffs. Maybe organise activities once in a week such as exercise or zumba to make the staffs keep being active. (Informant 10).

They should do some campaigns or activities. For example organise exercise program for every week or every month and make campaign on how to prepare healthy food. (Informant 11).

If possible provide counseling, campaign, and exercise program for the staffs with weight problem. Sometimes we also want to exercise but we don't get the chance to do so. (Informant 12).

Do more weight management programs more often. If possible do it every week. In the past there was a gymnasium to the hospital staffs, but now there is no gymnasium. In the past, when we finished working we would stop by the gymnasium to use it for a while. (Informant 14).

Make campaigns on healthy lifestyle such as fun run more frequently. There were programs on healthy lifestyles before but now they rarely organise it. (Informant 15).

... always let us follow the program to lose weight. Always make programs, I mean at this moment there are programs like that, run and all that but... I mean give more attention to shift workers. As the problem is when they send the staffs to join the courses, but those who joined the courses are not from the staffs with excess body weight. Usually, most of the participants who joined the courses, fun run, and all that, who volunteered to join these activities are those with normal BMI. (Informant 16).

For suggestion, do activities with the staffs. Such as conduct weekly or monthly exercise like aerobics, only for the staffs. (Informant 17).

Urm, if possible continue the events for health. Focus on the welfare of the workers and concern about these aspects. Sometimes not only towards the physical problem, they also have to concern about mental health. (Informant 19).

> Or maybe organise programs at the workplace maybe about 1 hour. For example, in one month, there is a program for a group of staffs for 10 days. Everyone must participate in the program but it takes turn. Around 4 p.m. or 5 p.m. they do activities such as zumba but not with the same participants, but with different staffs. At this moment, the staffs who concern and know more about health are the same group of staffs. Some other staffs don't participate. So actually start with this group then the other group take turns to join the programs. (Informant 20).

Gymnasium

In addition, three (3) of the informants suggested for the hospital to provide gymnasium for the staffs.

> If there is more budget maybe they can provide a gymnasium at the workplace, so that we don't have to pay when we want to use the gym. (Informant 5).
>
> Please open a gymnasium at the hospital. As you know some companies do provide a gymnasium for their staffs. (Informant 9).
>
> ... provide the equipments for exercise, such as provide a gymnasium in every hospital. Or maybe in one room where only the staffs can use it. At this moment, there is no gymnasium in any hospital. (Informant 18).

Make Sports Club

Meanwhile, only informant 5 suggested to create a sports club for the staffs.

> ... make sports club for the staffs to participate. (Informant 5).

Adjustment on Working Time

On the other hand, informant 20 suggested that the working time should be lessened and end earlier, which would allow staffs to have time in the evening to exercise.

> If possible, I want to say that the working time should end earlier than now. As we have to drive home, most of the workers who drive to their home will arrive at 6 p.m. or later than that, so it's hard. So if we want to encourage this, maybe around 4 p.m. or 5 p.m. or after *Asar* is a good time to do activities. But at that time we are still working, when we get home it's already late. (Informant 20).

4.3.5.2 Strategies Related with Motivation

Besides that, three of the informants including informant 3, 6, and 16 stated that encouragement is needed to help individuals in controlling their respective body weight.

> ... the support from people around us is another important thing. (Informant 3).
>
> Please reduce the workload and encourage the staffs to exercise. (Informant 6).
>
> So, maybe no awareness about this, some people are still lazy to join run activities. I mean, there should be more encouragement and motivation for those with excess body weight. (Informant 16).

There are two (2) informants who believed that one's attitude towards exercising and eating would be more effective in pursuing a healthy lifestyle.

> I think the initiatives that we have right now from the government are the best. It's just up to one's attitude to do it or not. (Informant 13).
>
> Actually, as for me I have to stop taking *teh tarik*, I think if I stop that it would be better. Then I have to stop taking something with sugar, such as iced tea, but I cannot do that. It's like a habit. (Informant 20).

4.3.5.3 Strategies Related with Improvement on Knowledge

In addition, the informants were asked on what is piece of information actually needed in order to control one's body weight. Ten (10) out of twenty (20) informants stated that they actually need to learn more about this. Most agreed that they need to know more about healthy eating and the right way to exercise. Quotations on this section are as followed.

> Information about the right intake of food and about exercises. (Informant 1).
>
> Urm, for weight, it's caloric intake... we have to know how to calculate the calories. (Informant 2).
>
> ... there should be one day course on the awareness about healthy eating. (Informant 4).
>
> I think it's important to know about the calories. (Informant 6).
>
> Urm, about the menu and activities that they organised. So when we know about it then we can join the program. (Informant 9).
>
> Information about the types of exercises and information about healthy eating. (Informant 10).
>
> There should be attention about this from the parties concerned, such as do CME, more awareness on healthy lifestyle to the staffs with health problem. As we have the counselor, dietitian so we have to plan how to do it, or maybe do a case study then make supervision. (Informant 18).
>
> The information... like... even though we are working in health sector, it does not mean that we know everything about healthy eating, the right way to prepare food, and the right way to do exercise. (Informant 11).
>
> Healthy eating and the right exercise. (Informant 14).
>
> About diet control. (Informant 19).

Enough Information

In contrast, three informants, in which all are medical assistants stated that they already had enough information on how to control body weight.

> For me the information is already enough. The problem is just self attitude. As we are in the healthcare sector, we already know about everything. (Informant 5).
>
> We know everything as there is a course about healthy lifestyle. Yes, there is a program of healthy lifestyle including the course that also includes about stop smoking and all that. (Informant 15).
>
> We already have all the information, it's up to an individual. (Informant 20).

4.4 Chapter Summary

This chapter showed all the findings related to this study, which were collected among healthcare workers on their experiences of daily routines. This chapter is aimed to analyse and report the results obtained on the factors that influence obesity among healthcare workers in Kedah. The chapter has presented the findings of each themes, sub-themes, and sub-sub themes that had emerged from the data. Through the analysis, there are a total of twenty-six factors (26) on the factors influencing obesity among healthcare workers. Twenty-two (22) of these factors are identified in previous studies, while four (4) were newly found from this study. Based on the twenty-six (26) factors found from the findings, among these factors are eight (8) food choice factors, three (3) eating out factors, five (5) eating patterns, five (5) job stressors, and five (5) working condition factors. The participants also suggested several strategies to control and prevent obesity. Chapter five will further elaborate on the discussion of the findings in this chapter.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

The main aims of this study were to explore the factors influencing obesity and explore the strategies to control obesity among healthcare workers. This chapter intensifies the discussion of research findings as shown in previous chapter. Based on the findings, a model on the factors influencing obesity is developed. Three emergent primary themes were dietary behaviour, job stressors, and working conditions. Aside from the data of emerged factors, there were several strategies suggested by the participants in controlling the increased prevalence of said issue. During the initial progress of the discussion, early data that had emerged from the interviews answered the first research question: the factors influencing obesity among healthcare workers.

5.2 Dietary Behaviour

The first theme showed that majority of participants reported different types of dietary behaviour which could be the factors influencing obesity. The research data came up with three sub-themes including their own food choice, eating out behaviour, and eating patterns. Based on their daily routine, the participants had reported several factors that could have influenced their food choice, leading to consummation of food with higher calories. In general, the data showed that although healthcare workers are those who expected to have good knowledge about healthy eating, they also have problems to follow the recommended dietary guidelines. Few respondents reported to frequent

occurrence of eating out, while the rest— majority of them reported with either having irregular meals or irregular meal schedule. In addition, few even admitted to having abnormal eating patterns. This subsection shall further discuss on the food choice, eating out behaviour, and eating patterns.

5.2.1 Food Choice

The findings have shown that the factors influencing one's choice in dietary are time pressure, convenience, social influence, appetite, limited food available, habit, and sugary drinks. Though mostly admitted that time pressure is their top most reason, given that they at times do not have the time to eat. Even if they were to squeeze it into their schedule, they would have to eat in a rushing manner. With that, a healthy meal would be unlikely. Results in this study suggest that due to time constraints, they tend to have irregular meals and it also leave them with limited option of choosing healthier meals. This finding is also in line with Nobrega et al. (2016) which reported that few complained about the time pressure inflicted by their own work, for it has become a challenge with the limited free time to even settle for healthier options. However, the study referred to low wage workers while this study referred to shift workers. Besides, few of the informants also stated that they tend to choose meals that are convenient to them, likely due to the aforementioned time factor. This could be the factor that some of them prefer to order delivery food from outside restaurants which might leads to higher energy intake. In fact, other related studies conducted by Arora et al. (2014) and Boon (2014) similarly

found the relation between convenience and eating out, provided same reasons as discussed.

Even though healthcare workers are known to have good knowledge on healthy eating habit as reported by Ardzi et al. (2014), there were respondents who admitted that social factor could have influenced their choices. The healthcare workers experienced significant challenges with respect to social influence towards their food choice. Although they know about healthy eating, it becomes a challenge for them to resist food offered or suggested by people around them. This piece of information is contradictory to a study by Lowden et al. (2010), whereby the absence of eating in a societal environment such as with family or friends might influence the food choice. One of the participants even stated that she would settle for the same drink as her husband's, while another would end up skipping breakfast given how her husband prefers not to.

One of the new factors on the factor influencing obesity is one's appetite as a few participants always eat certain type of food because they know it is nice. If the preference of certain type of food they like is the one with energy dense food, it becomes a problem if they frequently eat the same type of food which then might leads to obesity. It was discovered that some participants who listed with consumption of energy dense food faced a challenge to control their food intake as they eat according to their preferences. There were participants who agreed that they are likely to choose dishes that are tasty, depending on their personal preferences regardless of place or time. Despite so, there have been several studies to which demonstrated that night shift workers are more prone to food with higher fat content in comparison to those working during the day, though

they did not report anything on appetite (Bonnell et al., 2017; Cain et al., 2015; Yoshizaki et al., 2016).

Another newly found factor is how an array of food provided at one's workplace may also influence their picks. A few participants claimed that there is limited choice of food available at the workplace, leaving them with no choice but to eat what is available at the cafeteria. Although food at the cafeteria are decided by the owner, the hospital's management has to assess the menu, then propose healthier options. A previous literature also stated that there is a need for hospital worksites to provide a healthy environment in hospitals to effectively address obesity among their employees, unfortunately it did not report on the limited selections (Sharma et al., 2016).

Aside from that, two of the participants explained that they consume certain kinds of food and drinks due to habit. It may lead to obesity, especially if such habit-induced eating habit involves food or drinks that are high in calories. Another similar finding by Bonnell et al. (2017) had likewise identified one's habit as the reason for late night snacking among their own samples, along with the lack of healthier alternatives. Still, there is another aspect that could have caused the state of obesity of several participants which is their fondness towards sugary drinks instead of plain water. This is indeed a concern because sugary drinks contain higher calories as stated by Johnson et al. (2009), to which overconsumption of sugar and sugar-sweetened beverages might cause weight gain to the point of being obese.

After that, another factor that was reported by half of the total participants was that they consumed water lesser than the recommended water intake according to RNI for different

age groups and gender of eight to nine glasses as suggested in the Malaysian Dietary Guidelines by NCCFN (2010). Overall, this new factor of water intake which can be the factor influencing obesity provides a great contribution to current state of knowledge regarding obesity. Even though healthcare workers knew the recommended water intake, they did not follow the recommendation and on top of that they also reported with high consumption of sugary drinks. Several previous studies such as Daniels and Popkin (2010); Milla-Tobarra (2016); and Vij and Joshi (2014) shown the influence of water on one's body weight. Daniels and Popkin (2010) found that drinking sugary drinks instead of water was proven to increase the total energy intake with the subsequent meal in adults. In a recent study, Milla-Tobarra et al. (2016) reported that individual with obesity or overweight had low intake of water, though the study was conducted among children. Vij and Joshi (2014) however, showed a different finding that drinking 1.5 L of excessive water has impact on body weight and fat reduction, along with appetite suppression among overweight female participants. Therefore, it is shown that water intake also is an important factor in preventing obesity as stated by Daniels and Popkin (2010).

The other reasons found regarding dietary behaviour are double portion and fatigue. However, the poll for both factors was not as strong, given that only one participant had admitted to each factor. One stated that if she were to have a lot of time and is not busy, she found herself to eat a lot more than the usual, going for double portion. Meanwhile, the other merely stated that tiredness would cause her to feel hungry.

5.2.2 Eating Out

In addition, many participants in this study had also reported that they would prefer to eat out. This is parallel to Tan (2010) who stated that there is an emerging consumption pattern among Malaysians whereby they would frequently eat out, instead of having meals at home. Furthermore, the participants had also listed down several factors for this: too tired to cook, lack of time, a different preference, comfortability, and working the night shifts. Likewise, a study by Arora et al. (2014) reported participants who regularly tend to eat out because they have no time to cook. Preference to eat out among the participants becomes a concern as they mentioned of having energy dense food and sugary drinks when they eat out which might leads to obesity. All in all, eating outside can cause obesity, given how the food with high energy density and have high fat content as stated by Bes-Rastrollo et al. (2010) and Bezerra et al. (2012). Besides that, the participants also reported that they preferred sugary drinks if they eat out. Bezerra et al. (2012) found possible explanations on the factors that relate eating out and obesity, including large portion size, high fat content, energy density, and excessive amount of sugar and sugar-sweetened beverages.

5.2.3 Eating Patterns

On the other hand, the participants also explained their respective meal schedules. Nearly three quarters admitted to having irregular meals, whereby some of them tend to skip breakfast, some of them always skipped lunch, while only one of them tend to skip dinner. In general, the participants had irregular meals due to shift working hours and

time constraints. In order to cope with time constraints, participants typically skipped meals. Likewise, Berg et al. (2009) found that omitting breakfast may contribute to increased risk of obesity.

Besides having irregular meals, half of the total respondents admitted that they had irregular eating schedule. Study participants mentioned they could not have a proper meal due to busy schedules and they did not have specific time for break. Similar factor was observed from a study by Yoshizaki et al. (2016) which found that shift workers showed higher score for temporal eating patterns, indicating irregular timing of meals and number of meals consumed per day. Likewise, Freitas et al. (2015) reported that shift workers had three main meals a day at inappropriate times: a) day shift workers would have their supper at inappropriate time, while b) night shift workers would have breakfast at inappropriate time. However, both studies by Yoshizaki et al. (2016) and Freitas et al. (2015) did not relate this pattern of behaviour with obesity. It might be due to higher energy intake as stated by Lowden et al. (2010) that irregular eating could be the factor that contributes to higher energy intake among night shift workers.

Study participants also experienced with late night eating as they tend to order delivery food from outside restaurants during night shift. It becomes a concern considering that they eat heavy meals during midnight. From the findings of this study, they are somehow contradicted to Lowden et al. (2010), to which described night workers having the tendency of losing their appetite during the night shift as their bodies are programmed for fasting, restitution, and endogenous mobilization of blood glucose. Interestingly enough, the participant in this study admitted to having heavy meals at midnight, causing them to eat four heavy meals in one day, thus exceeding the daily recommended calories intake.

In addition, one of the participants mentioned that she tends to eat more than usual if she has to work for the night shift. This is supported by Mas et al. (2017), stating that people with late night eating syndrome tend to be overweight or obese.

This exact preference might be due to circadian misalignment. Marqueze et al. (2012) added that their samples who worked at night had increased level of ghrelin, a hormone that stimulates appetite, due to circadian misalignment which then led to overeating and increased risk of obesity. Wong et al. (2010) further explained that leptin on the other hand, is a hormone that helps us feeling full. However, the level of leptin is found to decrease among night shift workers due to circadian misalignment, unable to feel full neither satisfied after eating. This condition might cause them to crave food high in sugar and carbohydrates, thus increasing the risk of obesity.

Other than that, the participants also reported of a grazing behaviour, defined by Lowden et al. (2010) as a tendency of snacking whereby they would continuously and spontaneously eat, instead of maintaining a pattern of regular eating intervals. They had listed several types of snacks they have been consuming and most of the snacks are those with high calories. This finding is parallel to Antunes et al. (2010) and Tada et al. (2014), both reported that participants with higher intake of snacks were those with higher BMIs. Here, consumption of high calories snacks may be one of the reasons to obesity, especially when night shift workers have such tendency, eating snacks generally contained of high sugar, fat, and energy (Bonnell et al., 2017).

Although less common, some participants described with emotional binge eating when they are under stress. They explained that they tend to eat more when under stress and

this becomes a problem because it will increase their energy intake which then leads to obesity with less exercise and sedentary lifestyle. Mas et al. (2017) reported that binge eating involves consuming large amount of food a normal person would likely avoid. It might happen for a certain period of time due to emotional factors like tenseness, anxiety, frustration and dissatisfaction instigated by lack of self-control. The authors further added that people who undergo binge eating episodes tend to have excess weight. Similar finding was found by Gibson (2006); Rutters et al. (2009); and Yau and Potenza (2013) that those under stress are likely to eat more. Additionally, a study by Block et al. (2009) found that some of the participants had increased caloric intake, some of them had lower caloric intake, and some of them do not change their eating behaviour under stress. In contrast, this study showed slightly different result as some participants reported with eating more or some of them with dietary behaviour remained unchanged with no one describe that they lose appetite or eat lesser than usual when under stress.

Besides binge eating, the findings also showed that few participants explained to have addiction to certain type of food when under stress. The participants mentioned few highly palatable foods they tend to consume when under stress. Despite knowing this kind of food is not healthy, it seems that they could not control to avoid this food when under stress. Lemmens et al. (2011) pointed out that overweight participants had higher energy intake of highly palatable food such as desserts, indicating that there was a tendency of experiencing food craving when stressed– which might be potentially a coping mechanism. It was also found that workers with work-related stress had higher consumption of snacking, sweet, and energy dense food (Buss, 2012). As for Yau and Potenza (2013), it was stated that highly palatable diet contains high amount of fat and

sugar, and may possess addictive qualities. The authors stated that stress is an important factor to addiction towards certain types of food, which may contribute to an increased risk for obesity.

5.3 Job Stressors

The second qualitative theme identified from this study is job stressors. From the results, five sub-themes were discovered: job demand, inadequate staffing level, inadequate equipment availability, organisational climate, and social factor. As stress has identified to be the determinant of obesity, it would be beneficial to know the job stressors among healthcare workers with obesity. NIOSH (2008) stated that it varies across occupations, inclusive among healthcare related occupations, depending on the tasks. The respondents who revealed of having binge eating and food addiction towards certain kinds of food due to stress at the workplace were further asked about job stressors at the workplace.

The healthcare workers involved in this study were nurses and medical assistants. Majority of them reported that they are indeed stressed due to job demands, either due to workload or having too many patients in the ward. This situation could possibly happen because of inadequate staff at the hospital. This outcome is similar to a study by Faghri and Migrano (2013) on the issue of obesity among correctional officers, finding that workload was the common stressor at their workplace. Likewise with hospital staffs as conducted by Tsai and Liu (2012), and NIOSH (2008), though both studies did not relate it with obesity. The participants also complained that they are stressed at their workplace due to inadequate staffs, in agreement to NIOSH (2008) who believed that inadequate

staffing is one of the causes to occupational stress in healthcare settings. Besides, the participants also stated another stress factor which is due to inadequate equipment availability as listed by Cox et al. (2002) on the stress-related hazards without specifically referring to any particular occupations.

The findings also showed that the participants are stressed due to poor organisational climate which can be referred as conflicting communication styles, known to be one of the job stressors in hospital (NIOSH, 2008). Based on the complaints by the participants, it seems that unclear instructions from upper management do inflict stress on them as well. Nobrega et al. (2016) did draw out a conclusion that having high demand, yet low autonomy would actually affect available eating schedule throughout working days, which then affects their eating behaviour. In another aspect, the participants in this study would also become stressed from social factors concerning co-workers and patients. It could have been due to complaints from staff and being told to replace co-worker at the last minute. Though it could also be due to patients' behaviour in general. This occurrence is agreed upon by Nobrega et al. (2016), to which one of the job stressors among low wage workers is due to social aspects of their work and the respondents of the study also added that as a consequence of stress, they tend to consume more food overall or choose energy-dense comfort food. Although there are studies that reported individuals with weight discrimination are more vulnerable to stress and its symptoms, along the increased risk of obesity (Hatzenbuehler et al., 2009; Hayward et al., 2018; Sutin & Terracciano, 2013), none of the participants in this study mentioned about weight discriminations as a job stressor.

5.4 Working Conditions

From the study, majority of the participants had reported different types of working conditions, to which narrowed down to five sub-themes including time pressure, co-workers' influence, food environment at the workplace, work schedule, and activities at the workplace. Overall, majority of participants described that they did not do exercises due to time constraints and this could possibly happened due to the time available for them as sometimes they need to work day shift and night shift with additional commitment towards their families. However, some participants considered any movements at their workplace as a form of exercise. There was a respondent who explained with no exercise due to health condition, while another two admitted they simply do not exercise due to the overbearing fatigue. This finding is consistent with several previous studies inclusive Han et al. (2011); Nobrega et al. (2016); and Sharma et al. (2016), which reported that their selected respondents with low physical activity had higher chance of excess weight.

In contrast, a study by Di Milia and Mummery (2009) emphasised that long working hours of more than 12 hours would become an interference with several activities such as exercise, sleep, and social demand which then lead to obesity. In addition, many previous studies including Bushnell et al. (2010); Di Millia and Mummery (2009); Han et al. (2011); Ko et al. (2007); and Tsai and Liu (2012) had found that long working hours is the significant predictor of obesity which is not strongly supported in this study, as merely one participant stated that he had to work double shifts, making it hard for him to exercise.

Many participants also reported that influence from the co-workers do affect their dietary behaviour. It was observed that they can easily be influenced by their friends on food choice and they could not resist the food offered by their friends. The influence from co-workers towards dietary behaviour was mostly reported by nurses compared to other medical assistants. Parallel to the findings, a study by Persson and Martensson (2006) presented that nurses do experience craving for junk food or discretionary items when seeing their colleagues eating them. The study then added that the nurses often shared meals on several occasions and they tend to follow the behaviours of their colleagues including both positive and negative. Likewise, in a more recent study by Bonnell et al. (2017), it is found that the participants, who are identified as fire fighters said to practice group culture when eating. They displayed their very own approach to food preparation, selection and consumption, all planned with their co-workers in mind. The study revealed that the attitudes and dietary behaviour of co-workers might have influence on one's health, regardless positive or negative. However, in both studies by Bonnell et al. (2017) and Persson and Martensson (2006), they did not find the relation between the co-workers' influence on a dietary behaviour with obesity. All in all, from the findings of this study, it can be deduced that it is important for the healthcare workers to practice healthy eating as they might influence their friends at the workplace as well. This statement can be supported by Ranby et al. (2011) of which reported that improved dietary co-worker norms with nutritious eating might support group commitment towards health promoting behaviour.

In addition, the data also showed that environment at the workplace can be the factor influencing obesity among the participants as stated by Sharma et al. (2016) whereby

there is a need for participating hospital worksites to provide healthy environment in hospitals to effectively address obesity among their employees. Some of the participants explained that they prefer to eat at the workplace because there are many food choices, few even reported that there are people who would come to ward to sell food, though only one participant explained that there are frequent eating occasions at the workplace. This shows that the types of food available at the workplace also play an important role for the weight status of participants.

Obbagy and Essery (2012) stated that the food and beverages people consume in their daily lives can be influenced by their environment. Even though individuals have their own preference when it comes to eating, it is still dependant on what is available at their workplace such as the stores, and restaurants. Obbagy and Essery (2012) also added that it is associated with dietary behaviour. It is found that low intake of fruits and vegetables would cause one to have higher body weight. Similar finding was identified in a more recent study by Nobrega et al. (2016) that food environment at work is a big factor of excess weight among lower income workers. However, the data in this study lacks the details on types of food the participants are likely to consume at their workplace.

Study participants also experienced irregular sleeping pattern and the main reasons to this challenge is due to the night shift. They reported of not having enough sleep because they are only able to sleep for few hours during the daytime, despite working long hours the night before, as they also have commitments towards their families at home. In line with that, Eberly and Feldman (2010) reported that day sleepers experience inadequate amount of sleep along with poor sleeping quality, or worst having difficulty to fall asleep. Said researchers also added that majority of night shift workers have approximately five hours

of sleeping and this ongoing pattern may cause adverse health effects including obesity. Another possible explanation of irregular sleep being the determinant of obesity is described by Scheer et al. (2009) whereby sleep disturbance might cause imbalance of appetite hormones, resulted in increased hunger and metabolic changes. Parallel to that, Costa (2010) reported that shift workers with interrupted sleeping patterns along with poor quality and short duration might lead to weight gain. It is difficult to adapt new sleeping patterns as only a minority of night shift workers with less than 3% reported that they are able to adapt their circadian rhythm to nocturnal activity after a prolonged exposure to working during night shift (Sun et al., 2018). In different aspect, Knutson (2010) explained that insufficient sleep can be associated with alteration in appetite and satiety regulation, metabolism, insulin sensitivity, as well as fatigue which resulted in reduction of energy to be engaged in physical activities.

Another newly found factor in this study is workplace activities. One participant added that there is no longer exercise program organised by the hospital, while another explained despite initially joining the exercise program, she did not stick to it till the end. Both participants are from the same hospital, however the mentioned exercise program conducted at the hospital seems to be of opposite. While another blamed the lack of thereof execution, the other admitted that there is one despite the lacking motivation. This discrepancy could be possible if we were to consider that information about the exercise programs at the hospital may not be broadcasted as much. Especially when healthcare workers work in different rotating shifts. Therefore, the hospital has to find appropriate methods to deliver the information on the conducted programs to ensure that all hospital staffs are notified.

Several participants explained that it is a challenge to follow a healthy lifestyle due to sedentary activity at the workplace. Similar finding was shown by Sharma et al. (2016) which found that majority of their participants with excess weight did not get involved in vigorous physical activities, with nearly half of them would avoid moderate physical activity. This subsection has discussed several working conditions which can be the factors influencing obesity among healthcare workers. Next subsection will further discuss on several other factors that had emerged during data collection.

5.5 Other Factors

Besides the aforementioned factors of the three main themes (dietary behaviour, job stressors, and working conditions), few other factors did emerge from the data. They include childhood obesity and psychological factor. However, for both childhood obesity and psychological factors, only one participant had explained for each respective factor, making the two not strong enough to be classified as factors influencing obesity. One of the participants said that she was obese since little and recorded to have the highest BMI among the participants with reading of 51.26. This finding is parallel to several previous studies including Gupta et al. (2012); Hoque et al. (2014); and Naidu et al. (2013) which reported that children who are overweight or obese are more likely to be overweight or obese in their adulthood.

Followed suit, another participant disclosed psychological factor to her condition, whereby she eats due to fear that she might be feeling hungry or tired if she does not eat as regularly. That itself is a psychological condition she has developed herself. However,

a study by Degirmenci et al. (2015) on the relationship between psychological factor and obesity found that high level of depression and anxiety are suffered by individuals with obesity. Aside from that, they also experience problems in their eating stances and quality of life. The participant in this study probably referred her lack of self-control. As reported by a study done by Fan and Jin (2013), lower degree of self-control can be found among individuals with obesity compared to those with normal distribution, and this lack of self control is associated with poor eating and exercise routines. This condition might increase BMI as well as putting them at higher risk for obesity. Next section further discusses on the strategies to control and prevent obesity as suggested by the participants in this study.

5.6 Strategies to Control Obesity

As healthcare workers are among those with good knowledge about health, they were asked on the strategies that they would recommend to the government to encourage healthy lifestyle. As someone who has experienced the challenges, they would know better about suitable strategies, befitting the different shift working hours to improve their behaviour. One of the recommendations from many of the participants is the need to improve the knowledge, given how they need to be able to discern suitable strategies themselves. Albeit so, one of the participants did mention that even though they are working in the health sector, it does not mean that they know everything about healthy eating habit, let alone its preparation, and the right way to do exercise.

Therefore, it is important for healthcare workers to have adequate knowledge about healthy eating and exercise as reported in the study by Yahia et al. (2016), discovering

that students with greater nutritional knowledge consumed lesser unhealthy fats. The study added that the results showed the role of nutrition education as a potential to promote healthy eating patterns. Additionally, previous study by Ardzi et al. (2014) found that the nurses had the knowledge, but unable to adapt a healthy lifestyle and ironically enough, the participants had high percentage of excess weight.

Nurses were the ones mostly mentioned that they would require more information about healthy eating and exercise. In contrast, some of the medical assistants stated that they already have enough information and thought that the main problem is due to own attitude. Such different perspectives might be due to how courses related to healthy lifestyle only given to the medical assistants as mentioned by one of the medical assistants, yet none of the nurses did speak of it. Therefore, from this study, it is suggested that more information about eating healthy and doing the right exercise should be explained to healthcare workers, especially details on calories and the daily recommended amount as recommended by NCCFN (2010). The factors influencing obesity regarding dietary behaviour including food choice, eating out, and eating patterns found in this study can be controlled with improved knowledge. Furthermore, a better knowledge on weight management is also beneficial not only to healthcare workers themselves, but also those around them including their patients, friends, and family. Healthcare workers can be a great influence in preventing further increase to the prevalence of obesity in Malaysia.

Besides that, the participants also emphasised that motivation is needed to help individuals to control body weight. This strategy can also be applied to all the emerging themes in this study. For an example, social support would be helpful in assisting

individuals towards a healthier lifestyle. Encouragement from the government and employers would also help obese workers in controlling body weight through awareness programs on the awareness, courses, and exercises to further encourage them. This strategy also can be applied for the factors influencing obesity in relation to workplace conditions as the management from hospital should take note of the environment. They may suggest to the cafeteria to display calories of the food or perhaps adjust the portion to a suitable amount.

The strategies on motivation also can be related with one's attitude towards their lifestyle changes. For dietary behaviour, obese workers should control the amount of food they eat, types of food they consume, and also they should only eat following the estimated recommended calories for one day. However the effectiveness of motivation strategy alone is still lacking as the study by Hussain et al. (2018) combined motivation with other strategies that result in weight reduction among participants of study. A study by Chan and Woo (2010) recommended future research on the motivation for behavioural change in preventing obesity, as it is mentioned that obesity prevention and reduction depend on lifestyle changes taken by each individual.

Despite few of the participants stating that they considered movement at the workplace as an exercise, three quarters of them suggested that the government should put more effort in organising programs related to healthy lifestyle. It is shown that majority of them realised how important exercise is to control their weight. Few even asked the government to provide a gymnasium in the hospital that can only be accessed by the hospital staffs. One participant however, did suggest that a staff sports club would be amazing. Another suggested to adjust the working hours. The strategies on weight

reduction through motivation and exercise programs were found to be effective in reducing weight as reported by Hussain et al. (2018). Though the effectiveness on each of the strategy was not described by the study.

The strategies to control obesity among healthcare workers could be explained by the Health Belief Model used in this study as the participants explained the challenges they faced to practice healthy lifestyle which referred to perceived barriers in HBM. Then, they suggested several strategies to control obesity among healthcare workers based on the challenges they believed as a barrier for them to practice healthy lifestyle which can be referred to the concept of HBM that focused on personal beliefs about a disease and the available strategies to prevent the disease (Hayden, 2009).

Based on the experiences and perspectives from the participants, the recommendation for controlling the factors on dietary behaviour is that, motivation from the government and co-workers would help the healthcare workers to follow healthy eating. As this study revealed that emotional eating due to stress at the workplace might leads obesity, the management of hospital should be concerned on both mental health and physical health of hospital workers. For job stressors, based on their explanation about time constraints and workload, it can be concluded that more staff are needed in both hospitals to overcome the workload as stated by the participants. While for working condition factors, it can be improved by conducting exercise programs to hospital workers and improve their knowledge on healthy eating and healthy lifestyle as suggested by them through Continuous Medical Education (CME) to healthcare workers. It would be good if the hospital can conduct programs for those with obesity and give rewards to those who can achieve the targeted body weight. It is also suggested that the information about the

programs should be spread to all workers as contradicted information on exercise program was mentioned by workers from the same hospital which might happened when information did not reached to some workers.

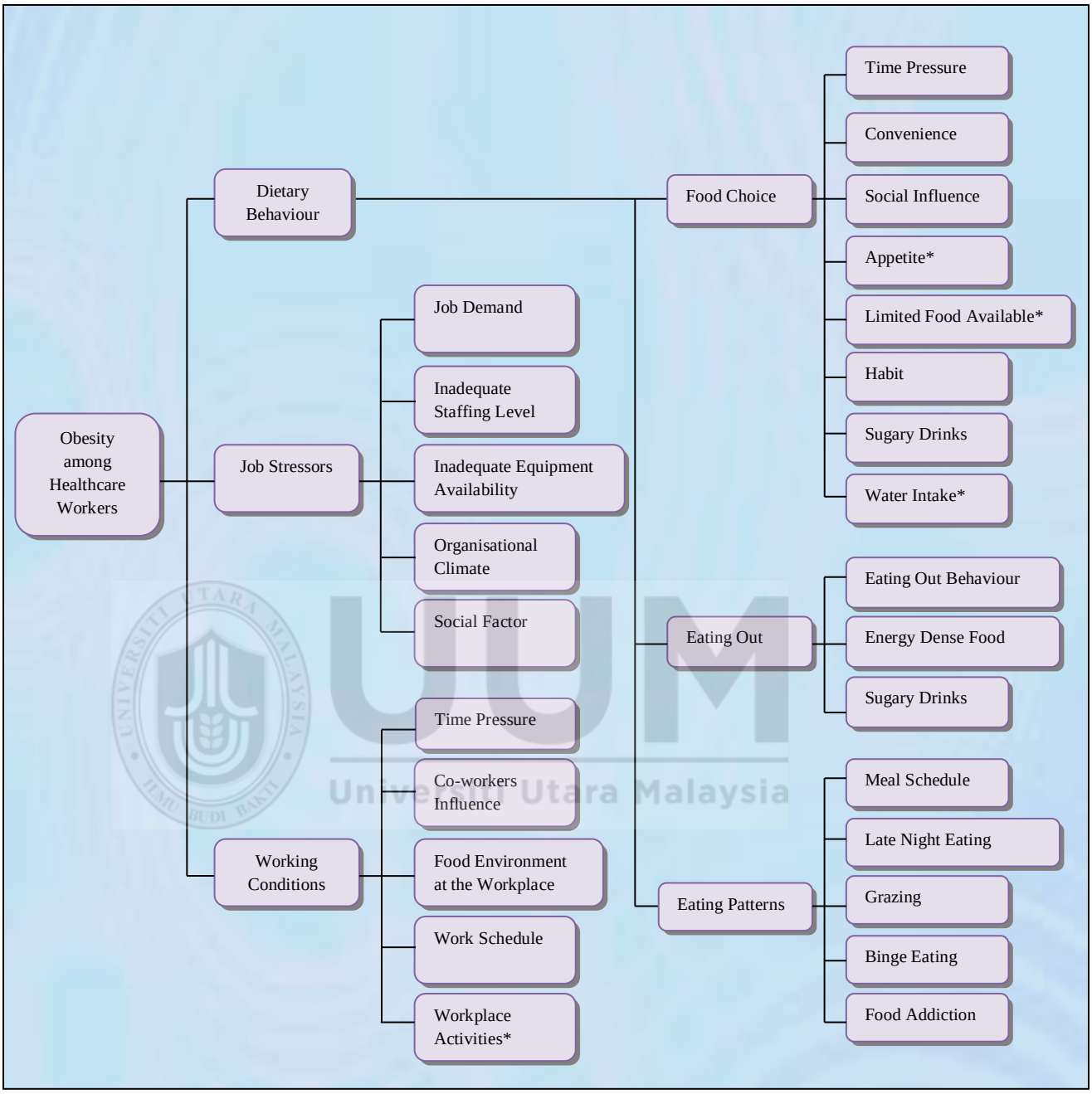
5.7 Research Implications

The effort of this research on the contribution towards theoretical knowledge can be described as modest. This section presents a new model developed from this study which can be the theoretical implication of this research on the factors influencing obesity among healthcare workers. The final theoretical framework as well as the key conclusions outlined below serves as the answers to the core research questions on what are the factors influencing obesity and strategies that can be done to control this issue. From the final theoretical framework, four key conclusions can be drawn. These are as follows:

1. There are sixteen (16) dietary behaviour factors that can be the factors influencing obesity among healthcare workers.
2. There are five (5) job stressors that can be the factors influencing obesity among healthcare workers.
3. There are five (5) working conditions that can be the factors influencing obesity among healthcare workers.
4. There are three (3) strategies that are suggested by the participants to control obesity among healthcare workers.

Theoretical implication in this study can be explained in two parts in which this study has made important contribution to enhance the body of knowledge. Firstly, twenty-two (22) factors which were found in this study reaffirms the factors that influenced obesity reported by previous studies among adults also happened among shift workers who have different daily routines and different meal patterns. This contribution is important on adding information to existing literature about the factors influencing obesity especially among shift workers. Secondly, four new factors found in this study including appetite, limited food available, water intake, and workplace activities showed large contribution on the current knowledge regarding the factors influencing obesity. These new factors showed that although healthcare workers expected to have good knowledge on healthy eating, they also had problems in controlling their dietary behaviour.

The findings can be explained by the Social Ecological Model referred in this study as multiple factors influencing obesity emerged from the data. Ecological models help to provide comprehensive frameworks that explain multiple and interacting determinants of health behaviours (Sallis et al., 2008). Dietary behaviour of the participants can be referred to individual factor in Social Ecological Model by Glanz (2013) due to individual's preference that influences the behaviour towards unhealthy eating patterns. Then for job stressors and working conditions it can be explained by interpersonal and organisational factor in Social Ecological Model by Glanz (2013) in which the behaviours towards unhealthy lifestyle and unhealthy eating patterns were discovered to be influenced by the environment and social influence. Figure 5.1 shows a developed model that illustrates the factors influencing obesity among healthcare workers in two public hospitals in Kedah.



*Legend: * Newly found factor*

Figure 5.1

Model for the Factors Influencing Obesity among Healthcare Workers in Two Public Hospitals in Kedah

Source: Developed for this research

In addition, this study also provides practical implications whereby the strategies suggested by the participants can be applied at the workplace to control obesity. There are three strategies suggested by the participants: exercise programs, motivation, and improvement on knowledge. As a matter of fact, it is found that the effectiveness of the previously mentioned strategies is confirmed in accordance to a previous study on effective nutrition education (Yahia et al., 2016). Nonetheless, upon further study, it is recommended to revaluate the effectiveness when it comes to controlling their body weight. In a recent study, Hussain et al. (2018) found several combined strategies that are effective on weight reduction. They include motivational workshop, one-to-one counselling on healthy diet, supervised exercise training, and behavioural self-monitoring. However, the effectiveness on each of the strategy is not described in the study.

5.8 Limitations

Several limitations had been identified throughout this study. One of the limitations of this study is the method of data collection via phone interview should be conducted at appropriate time. This is because one of the collected data cannot be used for this study due to the line being interrupted during the phone call for it was raining. Due to hazy conversation, some data were missing. Besides, after analyzing the transcriptions, it became apparent that the wording of questions and inquiries upon topic areas could have been improved. During the interviews, sometimes the probing questions from the interviewer were somewhat leading, which may have affected participants' responses.

Other than that, the results of this study cannot be used to generalise a wider population as qualitative study does not imply generalisation as a quantitative data would. However, the model developed for this study does reflect the participants' experience and belief regarding the factors influencing obesity among healthcare workers, and partial generalisation could be made to other night shift workers with similar work schedule.

5.9 Recommendation for Future Research

As this study helps to add more insights on the factors influencing obesity and provide possible strategies to control obesity among healthcare workers, future study should investigate the effectiveness of the strategies, so that the most effective method can be applied upon the workers in Malaysia especially when there is as high prevalence of obesity found among Malaysian adults. It can be done through an intervention study on these strategies. The next part further concludes the overall insights of this study.

5.10 Conclusion

This research aimed to explore the factors influencing obesity among healthcare workers and to explore the strategies that can be done to control obesity. Twenty-six factors (26) that arose among healthcare workers had emerged from the findings, forming three main themes including dietary behaviour, job stressors, and working conditions. This study has made literature contributions in the light of the mentioned findings. First, the confirmation of literature-identified factors reaffirms current understanding of the factors

influencing obesity. Previous studies about the determinants of obesity mainly focused among adults while this study specifically focused among shift workers who showed different daily routines and dietary behaviour. Despite twenty-two (22) of the factors already reported by the previous studies, it reaffirms that these factors also happened among those who worked rotating shift.

The finding also showed that although healthcare workers are knowledgeable about health, they also practice similar dietary behaviour with other adults with obesity. In addition of the previous studies that reported the association of stress and obesity, this study further provides the details on the determinant of emotional eating due to stress and the conditions that caused stress at the hospital. The participants reported that stress leads them to binge eating and food addiction. This study also reaffirm that working condition can be the factor influencing obesity in which it affects the workers' dietary behaviour and exercises. This contribution is important as it helps to strengthen and give additional support to existing knowledge-base.

Second, the identification of four new factors on the factors influencing obesity including appetite, limited food available, water intake, and workplace activities is an important contribution to current literature. The healthcare workers experienced significant challenges with respect to healthy eating. It was observed that although the healthcare workers mentioned they know about healthy eating, some of them could not control their appetite and water intake. Motivation from the employers and co-workers might help to control these dietary behaviours. As this study was conducted to hospitals, new factors on workplace activities and limited food available had emerged as factors influencing obesity. There were several contradicted arguments on workplace activities as some

reported that they moved a lot at the workplace, some revealed that there were exercise programs conducted in the past but there are no more such activities, while a few participants mentioned about sedentary activity at the workplace. Although some participants considered movements at the workplace as exercises, many of them suggested that the hospitals should continue to conduct exercise programs which used to be conducted in the past. Some reported that limited food available at the workplace leave them with no choice but to eat the food available at the cafeteria. The cafeteria is suggested to show the calories of each food so that healthcare workers have the knowledge on how much calories that they have taken for a day. It is also recommended that the hospital should suggest to the management of the cafeteria to provide healthier options of food which can be obtained within short period of time given that many of them concerned about the time available for them to eat healthier food. It would be good if the hospital can provide food delivery from the cafeteria with healthier options as some of them revealed of ordering food delivery from outside restaurants.

Lastly, based on the factors influencing obesity derived from the data, several strategies were suggested by the participants that can be done to control obesity among healthcare workers. The participants suggested to the government to conduct exercise programs at the workplace and build a gymnasium at each hospital, increase motivation among workers with obesity to control their weight, and improvement on knowledge about healthy eating and healthy lifestyle. Findings indicated that obese healthcare workers do require reliable information on healthy eating especially on how much calories they need to take per day and the right exercise to achieve personal health and weight management goals.

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APPENDIX A

Approval Letter from Medical Research and Ethics Committee

JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN
(Medical Research & Ethics Committee)
KEMENTERIAN KESIHATAN MALAYSIA
d/a Institut Pengurusan Kesihatan
Jalan Rumah Sakit, Bangsar
59000 Kuala Lumpur

Tel.: 03-2287 4032/2282 0491/2282 9085
03-2282 9082/2282 1402/2282 1449
Faks: 03-2282 0015

Ref:KKM/NIHSEC/P18-2307(12)
Date: **04-February-2019**

FASIHAH BINTI AZHARI
UNIVERSITI UTARA MALAYSIA (UUM)

Dear Dato'/ Dr/ Sir/ Madam,

ETHICS INITIAL APPROVAL:

NMRR-18-2320-43322 (IIR)
FACTORS INFLUENCING OVERWEIGHT AND OBESITY AMONG HEALTHCARE WORKERS IN KEDAH

This letter is made in reference to the matter above.

2. The Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (MOH) has provided ethical approval for this study. Please take note that all records and data are to be kept strictly **CONFIDENTIAL** and can only be used for the purpose of this study. All precautions are be taken to maintain data confidentiality. Permission from the District Health Officer / Hospital Administrator/ Hospital Director and all relevant heads of departments /units where the study will be carried out must be obtained prior to the study. You are required to follow and comply with their decision and all other relevant regulations including the Access to the Biological and Benefit Sharing Act 2017.

3. The investigators involved in this study are:

Hospital Sultan Abdul Halim
Fasihah Binti Azhari (Principal / Coordinating Investigator)

Hospital Sultanah Bahiyah
Fasihah Binti Azhari (Principal / Coordinating Investigator)

4. The following study documents have been received and reviewed with reference to the above study:

Documents received and reviewed with reference to the above study:

1. Cover letter to MREC (Version 1, dated 29-01-2019)
2. Declaration of Conflict of Interest (COI) (Version 2, dated 29-01-2019)
3. Protocol (Version 3, dated 26-01-2019)
4. English: Patient Information Sheet/ Informed Consent Form (Version 4, dated 28-01-2019)
5. Malay: Patient Information Sheet/ Informed Consent Form (Version 5, dated 28-01-2019)
6. Questionnaire (Version 6, dated 29-01-2019)
7. Data Collection Form (Version 7, dated 29-01-2019)
8. Follow-up Review Report (Version 9, dated 29-01-2019)
9. IA-HOD-IA and CV of:
    - Fasihah Binti Azhari

.../2-

5. Please note that the approval is valid until **03-February-2020**.The following are to be reported upon receiving ethical approval. Required forms can be obtained from the Medical Research Ethics Committee (MREC) website (**http://www.nih.gov.my/mrec**).

i. **Continuing Review Form** has to be submitted to MREC within 2 months (60 days) prior to the expiry of ethical approval.
ii. **Study Final Report** upon study completion to the MREC.
iii. Ethical approval is required in the case of **amendments/ changes** to the **study documents/ study sites/ study team**. MREC reserves the right to withdraw ethical approval if changes to study documents are not completely declared.
iv. **Applicable for Clinical interventional Studies only:** Report occurrences of **all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs)** and **Protocol Deviation/Violation** at all MREC approved sites to MREC. SAEs are to be reported within 15 calendar days from awareness of event by investigator. Initial report of SUSARs are to be reported as soon as possible but not later than 7 calendar days from awareness of event by investigator, followed by a complete report within 8 additional calendar days.

6. There will be **20** subjects/ patients/ respondents targeted to be enrolled in this study within Malaysia.

7. Please take note that the reference number of this letter must be stated in all future correspondence related to this study to facilitate the administrative processes.

Comments (if any): **NIL**

Project Sites:
HOSPITAL SULTAN ABDUL HALIM
HOSPITAL SULTANAH BAHIYAH

Decision by Medical Research & Ethics Committee:
(√) Approved
( ) Disapproved

Date of Approval : **04-February-2019**

.....
DR. HJH SALINA BINTI ABDUL AZIZ
Chairperson
Medical Research Ethics Committee
Ministry of Health Malaysia
E-mel: mrecsec@nih.gov.my

c.c:

HRRC Hospital Sultanah Bahiyah

CM\MREC_Share\Approval 2019\Expedited by Primary Reviewer\February 2019\43322

JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN
(Medical Research & Ethics Committee)
KEMENTERIAN KESIHATAN MALAYSIA
d/a Institut Pengurusan Kesihatan
Jalan Rumah Sakit, Bangsar
59000 Kuala Lumpur

Tel.: 03-2287 4032/2282 0491/2282 9085
03-2282 9082/2282 1402/2282 1449
Faks: 03-2282 0015

Ruj.Kami : KKM/NIHSEC/P18-2307(11)
Tarikh : **04-Februari-2019**

FASIHAH BINTI AZHARI
UNIVERSITI UTARA MALAYSIA (UUM)

Dato'/ Dr/ Tuan/ Puan,

SURAT KELULUSAN ETIKA:

NMRR-18-2320-43322 (IIR)
FACTORS INFLUENCING OVERWEIGHT AND OBESITY AMONG HEALTHCARE WORKERS IN KEDAH

Dengan hormatnya perkara di atas adalah dirujuk.

2. Bersama dengan surat ini dilampirkan surat kelulusan saintifik dan etika bagi projek ini. Segala rekod dan data subjek adalah SULIT dan hanya digunakan untuk tujuan kajian dan semua isu serta prosedur mengenai *data confidentiality* mesti dipatuhi. Kebenaran daripada Pengarah Hospital / Institusi di mana kajian akan dijalankan mesti diperolehi terlebih dahulu sebelum kajian dijalankan. Dato'/ Tuan/ Puan perlu akur dan mematuhi keputusan tersebut dan undang-undang lain yang berkaitan termasuk Akta Akses kepada Sumber Biologi dan Perkongsian Faedah 2017.

3. Penyelidik- penyelidik yang terlibat ialah:

   Hospital Sultan Abdul Halim
   Fasihah Binti Azhari (Penyelidik Utama)

   Hospital Sultanah Bahiyah
   Fasihah Binti Azhari (Penyelidik Utama)

4. Adalah dimaklumkan bahawa kelulusan ini adalah sah sehingga **03-Februari-2020**. Tuan/Puan perlu menghantar dokumen-dokumen seperti berikut selepas mendapat kelulusan etika. Borang-borang berkaitan boleh dimuat turun daripada laman web Jawatakuasa Etika & Penyelidikan Perubatan (JEPP) (http://www.nih.gov.my/mrec).

   i. ***Continuing Review Form*** selewat-lewatnya dalam tempoh 2 bulan (60 hari) sebelum tamat tempoh kelulusan ini bagi memperbaharui kelulusan etika.
   ii. ***Study Final Report*** pada penghujung kajian.
   iii. Mendapat kelulusan etika sekiranya terdapat pindaan ke atas sebarang dokumen kajian/ lokasi kajian/ penyelidik. Pihak JEPP mempunyai hak untuk menarik balik kelulusan etika sekiranya terdapat perubahan dokumen kajian yang tidak diisytiharkan.
   iv. Kajian berkenaan intervensi klinikal sahaja: Laporan mengenai ***all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs)*** dan ***Protocol Deviation/Violation*** di lokasi kajian yang diluluskan oleh JEPP jika berkenaan. *SAE* perlu dilaporkan dalam tempoh 15 hari kalender dari kesedaran kejadian (*awareness of event)* oleh penyelidik. Laporan awal *SUSAR* perlu dikemukakan seawal mungkin tapi tidak melewati 7 hari calendar dari kesedaran kejadian oleh penyelidik, disusuli dengan laporan lengkap dalam tempoh tambahan 8 hari kalender.

.../2-

Ruj.Kami : KKM/NIHSEC/P18-2307(11)

5. Bilangan subjek/ pesakit/ responden yang disasarkan untuk menyertai kajian ini di Malaysia adalah **20 orang**.

6. Sila ambil maklum bahawa sebarang urusan surat-menyurat berkaitan dengan penyelidikan ini haruslah dinyatakan nombor rujukan surat ini untuk melicinkan urusan yang berkaitan.

Komen (jika ada) : **NIL**

Lokasi kajian:
HOSPITAL SULTAN ABDUL HALIM
HOSPITAL SULTANAH BAHIYAH

Keputusan Jawatankuasa Etika dan Penyelidikan Perubatan:
(√) Lulus
( ) Tidak lulus

Tarikh Kelulusan Etika : **04-Februari-2019**

Sekian terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

.....
DR. HJH SALINA BINTI ABDUL AZIZ
Pengerusi
Jawatankuasa Etika & Penyelidikan Perubatan
Kementerian Kesihatan Malaysia
E-mel: mrecsec@nih.gov.my

s.k:

HRRC Hospital Sultanah Bahiyah

CM\MREC_Share\Approval 2019\Expedited by Primary Reviewer\Februari 2019\43322

APPENDIX B

Approval from Director of Hospital Sultan Abdul Halim

MAKLUMBALAS PERMOHONAN KEBENARAN PENGGUNAAN HOSPITAL SULTAN ABDUL HALIM UNTUK MENJALANKAN PENYELIDIKAN

Tajuk Penyelidikan : Factors Influencing Overweight and Obesity among Healthcare Workers in Kedah

Nama Penyelidik dan Institusi : Fasihah Binti Azhari, Universiti Utara Malaysia

Pihak hospital/institusi dengan ini membuat keputusan seperti berikut : -

☑ Membenarkan projek penyelidikan dijalankan

☐ Tidak membenarkan projek penyelidikan dijalankan

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah

.....

(Dr. Zainal Bin Che Mee)

S.K.

Ketua CRC Hospital Sultan Abdul Halim

Approval from Director of Hospital Sultanah Bahiyah

MAKLUMBALAS PERMOHONAN KEBENARAN PENGGUNAAN HOSPITAL SULTANAH BAHIYAH UNTUK MENJALANKAN PENYELIDIKAN

Tajuk Penyelidikan : Factors Influencing Overweight and Obesity among Healthcare Workers in Kedah
Nama Penyelidik dan Institusi : Fasihah Binti Azhari, Universiti Utara Malaysia

Pihak hospital/institusi dengan ini membuat keputusan seperti berikut : -

☑ Membenarkan projek penyelidikan dijalankan

☐ Tidak membenarkan projek penyelidikan dijalankan

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah

.....
(Dr. Zaiton binti Udin)
DR ZAITON BT UDIN
Pendaftaran MPM: 27346
Pengarah
Hospital Sultanah Bahiyah
Alor Setar, Kedah

S.K.
Ketua CRC Hospital Sultanah Bahiyah

APPENDIX C

Information Sheet

SCHOOL OF BUSINESS MANAGEMENT
UNIVERSITI UTARA MALAYSIA
SINTOK, KEDAH.

TITLE: THE DETERMINANTS OF OBESITY AMONG HEALTHCARE WORKERS IN TWO PUBLIC HOSPITALS IN KEDAH

Dear participant,

This research aims to study about obesity among healthcare workers in Kedah. Several factors which might influence obesity among healthcare workers will be evaluated in this study. The information obtained from this research might help the government and employers to control obesity which keeps increasing in Malaysia. The researcher is going to ask a few questions regarding the factors which might influence obesity. The interview will take about 15-30 minutes.

The interview will be conducted immediately after your consent. The name of participants will not be mentioned in the interview and will not be included in the report. Personal information about participant of study will remain strictly confidential.

The information obtained will be analysed and will be used only for academic purposes. If you are willing to participate in this study, please sign the consent form and return it to the researcher. If you have any question regarding this research, you may ask directly to the researcher.

Thank you for considering this request to participate in this study.

Sincerely,

FASIHAH BINTI AZHARI
UNIVERSITI UTARA MALAYSIA

SCHOOL OF BUSINESS MANAGEMENT
UNIVERSITI UTARA MALAYSIA
SINTOK, KEDAH.

TAJUK KAJIAN: FAKTOR YANG MEMPENGARUHI OBESITI DALAM KALANGAN KAKITANGAN KESIHATAN

Para peserta yang dihormati,

Kajian ini adalah berkenaan masalah obesiti dalam kalangan kakitangan kesihatan di negeri Kedah. Beberapa faktor yang mungkin menyebabkan obesiti dalam kalangan kakitangan kesihatan akan dinilai dalam kajian ini. Maklumat yang diperoleh daripada kajian ini dapat membantu kerajaan serta para majikan bagi menangani masalah obesiti yang semakin meningkat di Malaysia. Penyelidik akan bertanyakan beberapa soalan berkaitan faktor-faktor yang mungkin mempengaruhi obesiti. Sesi temubual ini hanya mengambil masa selama 15-30 minit.

Sesi temubual akan dijalankan setelah mendapat persetujuan daripada peserta. Nama peserta tidak akan disebut dalam temubual serta tidak akan disertakan dalam laporan. Segala maklumat berkaitan peserta akan dirahsiakan.

Maklumat yang diperoleh akan dianalisis dan akan digunakan bagi tujuan akademik sahaja. Sekiranya anda bersetuju untuk menyertai kajian ini, sila tandangan surat persetujuan yang diberikan dan kembalikan surat tersebut kepada penyelidik. Para peserta boleh terus tanyakan kepada penyelidik jika terdapat sebarang pertanyaan berkenaan kajian.

Terima kasih kerana meluangkan masa dan memberikan kerjasama bagi menjayakan kajian ini.

Yang ikhlas,

FASIHAH BINTI AZHARI
UNIVERSITI UTARA MALAYSIA

APPENDIX D

Consent Form

I would like to confirm that I have read and understood the information sheet regarding the research and have had the opportunity to ask questions. I have received an explanation of the purpose and duration of this interview.

I, _____(name of participant) hereby consent to participate in the interview.

I understand that:

a. I understand that my participation is voluntary. I can stop participating in the interview at any time and I am free to not answer any particular question.
b. The information gained in this study will be reported for academic purposes and my name will not be identified in any presentation or report. Information concerning me will remain strictly confidential.
c. I can ask the interviewer, at any time for any additional information.

I agree that this interview to be recorded. I understand that the audio recording made of this interview will be used only for data analysis, from which I would not be personally identified, may be used for report and presentation for academic purposes developed as a result of research.

Name of participant:	Name of principal investigator:
_____	_____
Date: _____	Date: _____
Signature:	Signature:
_____	_____

Borang Persetujuan

Saya dengan ini mengesahkan bahawa saya telah membaca maklumat mengenai kajian ini dan telah diberi peluang untuk bertanya sebarang soalan berkaitan. Saya juga telah menerima penerangan berkenaan tujuan serta tempoh masa bagi menjalankan kajian ini.

Saya, _____(nama peserta) dengan ini bersetuju untuk menyertai kajian ini.

Saya faham bahawa:

a. Saya faham penyertaan saya dalam kajian ini adalah secara sukarela. Saya boleh berhenti penyertaan dalam temubual pada bila-bila masa dan saya bebas untuk tidak menjawab mana-mana soalan.
b. Maklumat yang diperoleh daripada kajian ini hanya akan digunakan bagi tujuan akademik dan nama saya tidak akan dimasukkan dalam pembentangan atau laporan. Maklumat berkaitan saya akan dirahsiakan.
c. Saya boleh bertanya kepada penyelidik pada bila-bila masa bagi mendapatkan sebarang maklumat tambahan.

Saya juga bersetuju bahawa temubual ini akan dirakam. Saya faham bahawa rakaman yang dibuat semasa temubual hanya akan digunakan untuk analisis data, dan maklumat berkaitan saya tidak akan disebut, dan keputusan kajian ini hanya akan digunakan untuk pembentangan dan laporan bagi tujuan akademik.

Nama peserta:	Nama penyelidik:
_____	_____
Tarikh: _____	Tarikh: _____
Tandatangan:	Tandatangan:
_____	_____

APPENDIX E

Study ID: _____
(For researcher use only)

Personal Information

Age (*Umur*) :
Ethnicity (*Bangsa*) :
Gender (*Jantina*) : 1- ☐ Female 2- ☐ Male
Religion (*Agama*) :
Occupation (*Pekerjaan*) :
Working Time (*Masa Bekerja*) :
Weight (*Berat*) :
Height (*Tinggi*) :
Body mass index (*Indeks jisim badan*) :

1)Marital status (*Taraf perkahwinan*):
1- ☐ Married (*Kahwin*)
2- ☐ Not married (*Belum kahwin*)
3- ☐ Widow / Widower/ Divorced (*Balu, Duda, Janda)*

2)Do you have children? (*Adakah anda mempunyai anak*)?
1- ☐ Yes (*Ya*) 2- ☐ No (*Tidak*)

3)If yes, how many children do you have and how old are they? (*Jika ada, berapa orang anak anda dan berapakah umur mereka*?

_____

4)Live with (*Menetap dengan*):
1- ☐ Family (*Keluarga*) 2- ☐ Self (*Sendiri*) 3- ☐ Housemates (*Teman serumah*)

5)Educational level (*Tahap pendidikan*)
1- ☐ Primary (*Sekolah rendah*) 2- ☐ Secondary (*Sekolah menengah*)
3- ☐ College (*Kolej*) 4- ☐ University (*Universiti*)

6)What is your average income per month? (*Apakah purata pendapatan anda sebulan*?)
1- ☐ RM0-499 2- ☐ RM 500-999 3- ☐ RM 1000-2999
4- ☐ RM 3000-4999 5- ☐ More than RM 5000

7)Do you have any health problem? If yes, please specify. (*Adakah anda mempunyai masalah kesihatan? Jika ya, sila nyatakan*)

_____

APPENDIX F

Interview Guiding Questions

Interview protocol:

Assalamualaikum/ Good morning/ Good evening. I am doing a study among shift workers and I am interested to know the factors that influence obesity among healthcare workers.

I am interested in knowing more about how is your dietary behaviour, the factors that influence your food choice, and how is your working condition. This research will help to develop a better understanding of the dietary behaviour of shift workers and how their working conditions relate with obesity.

This interview will take about 15 minutes to 30 minutes, if you agree, it will be recorded. The recorded interview will be written out word by word however your name or any other personal information will not be on your interview or any other documents. If at any stage you don't want to continue with the interview, just let me know and we can stop. The results of this study will be analysed for a Master's thesis and presented for academic purposes. If it is okay with you I will begin the interview.

Guiding questions:

1) On an average day, how many main meals do you eat?

2) Do you usually eat breakfast?
   Probes: If no, why not? If yes, do you usually eat breakfast at home or do you eat out? If at home, why and what do you eat for breakfast? If out, why, where is it, and what do you eat for breakfast? Normally, what time do you eat breakfast?

3) Do you usually eat lunch at home or do you dine out?
   Probes: If at home, why and what do you eat for lunch? If dine out, why, where is it, and what do you eat for lunch? Normally, what time do you eat lunch?

4) Do you usually eat dinner at home or do you dine out?
   Probes: If at home, why and what do you eat for dinner? If dine out, why, where is it, and what do you eat for dinner? Normally, what time do you eat dinner?

5) On an average day, how many times do you snack if at all?
   Probes: If yes, do you purchase the snacks or are they prepared at home? If purchased, where do you usually buy your snacks? What do you usually have for snacks? Normally, how many glass of drinks you have per day? What do you usually drink?

6) How much do you spend for one day if you eat at home and how much is it if you dine out?

7) When do you eat while at work? How long is your break time?

8) How do you decide what you will eat while at work?
   Probes: Did you eat the meals during break with anyone else? Normally where did you eat during break?

9) How do you feel about your work?
   Probes: How do you feel about the workplace? What are the main problems faced by you at work? How do you face the problems?

10) Tell me about a typical work day?
    Probes: What opportunities do you have for breaks? How many hours do you sleep during working day? Normally, what time you sleep during working day?

11) Do you exercise on working day? Why?
    Probes: Do you exercise during weekends? Why? If you do, what type of exercise you normally do? How often do you exercise per week and where you do the exercise? How long do you exercise for every session?

12) What do you think about weight management?
    Probes: What is the challenge that you faced in following healthy lifestyle? What type of information is needed to control weight? What would you suggest for the government to encourage healthy lifestyle among healthcare workers?

Soalan-soalan Temubual

Protokol temubual:

Assalamualaikum/ Selamat sejahtera. Saya sedang menjalankan kajian dalam kalangan pekerja syif dan saya ingin mengkaji faktor-faktor yang mempengaruhi obesiti dalam kalangan pekerja kesihatan.

Saya ingin mengetahui dengan lebih lanjut berkenaan cara pemakanan, faktor yang mempengaruhi pemilihan makanan, dan bagaimana keadaan di tempat kerja. Kajian ini akan membantu memahami cara pemakanan dan keadaan di tempat kerja yang berkaitan dengan obesiti.

Sesi temubual ini akan mengambil masa selama 15 minit ke 30 minit. Jika anda bersetuju, perbualan ini akan dirakam. Perbualan yang dirakam akan ditulis kembali tetapi nama peserta serta apa-apa maklumat berkaitan peserta temubual tidak akan disebut dalam perbualan dan tidak akan ditulis dalam mana-mana dokumen. Jika anda tidak mahu meneruskan perbualan, sila beritahu kepada penyelidik. Keputusan kajian ini hanya akan dianalisis bagi tesis Master dan akan dibentangkan bagi tujuan akademik sahaja. Jika anda bersedia, saya akan mula sekarang.

Soalan:

1) Biasanya, berapa kali anda makan hidangan utama dalam sehari?

2) Biasanya, berapa kerap anda makan sarapan dalam seminggu?
   Probes: Jika tidak ambil sarapan, mengapa? Jika ya, selalunya anda makan sarapan di rumah atau di luar? Jika di rumah, mengapa dan apa yang dimakan? Jika di luar, mengapa, di mana, dan apa yang dimakan? Biasanya pukul berapa anda sarapan?

3) Selalunya, anda makan tengah hari di rumah atau di luar?
   Probes: Jika di rumah, mengapa dan apa yang dimakan? Jika di luar, mengapa, di mana, dan apa yang dimakan? Biasanya pukul berapa anda makan tengah hari?

4) Selalunya, anda makan malam di rumah atau di luar?
   Probes: Jika di rumah, mengapa dan apa yang dimakan? Jika di luar, mengapa, di mana, dan apa yang dimakan? Biasanya pukul berapa anda makan malam?

5) Biasanya, berapa kali dalam sehari anda makan makanan ringan?
   Probes: Selalunya, anda membeli atau membuat makanan ringan tersebut di rumah? Jika dibeli, dimanakah anda membeli makanan ringan? Apakah makanan ringan yang selalu anda makan? Biasanya berapa gelas air anda minum dalam sehari? Biasanya air apa?

6) Berapa anggaran yang dibelanjakan dalam sehari sekiranya anda makan makanan dari rumah dan berapa anggaran yang dibelanjakan sekiranya anda makan di luar?

7) Pukul berapa anda makan pada waktu bekerja? Berapa lama waktu rehat?

8) Apakah faktor yang mempengaruhi pemilihan makanan di tempat kerja?
   Probes: Adakah anda makan semasa waktu rehat bersama sesiapa? Biasanya di mana?

9) Apa pendapat anda tentang tugasan harian anda apabila bekerja?
   Probes: Bagaimana dengan keadaan di tempat kerja? Apakah masalah yang dihadapi anda semasa di tempat kerja? Bagaimana cara anda menangani masalah tersebut?

10) Bagaimana rutin harian anda bekerja?
    Probes: Apa kemudahan yang disediakan semasa rehat? Berapa jam biasanya anda tidur pada hari bekerja? Biasanya pukul berapa anda tidur pada hari bekerja?

11) Adakah anda melakukan senaman pada hari bekerja? Mengapa?
    Probes: Adakah anda melakukan senaman pada hujung minggu? Mengapa? Jika anda melakukan senaman, biasanya apa jenis senaman yang dilakukan? Di mana anda bersenam? Berapa kali dalam seminggu anda bersenam? Berapa lama anda bersenam bagi setiap sesi?

12) Apa pendapat anda mengenai pengurusan berat badan?
    Probes: Apakah cabaran yang anda hadapi di tempat kerja bagi mengikuti gaya hidup sihat? Apakah maklumat yang diperlukan untuk mengawal berat badan? Apakah cadangan anda pada kerajaan bagi menggalakkan gaya hidup sihat dalam kalangan pekerja kesihatan?